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Service Life of Craney Island Dredged Material Management Area Under Proposed Restricted Use Program

by Timothy D. Stark
University of Illinois at Urbana-Champaign

Prepared for U.S. Army Engineer District, Norfolk

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by Timothy D. Stark

University of Illinois at Urbana-Champaign
205 N. Mathews Avenue
Urbana, IL 61801-2352

Final report

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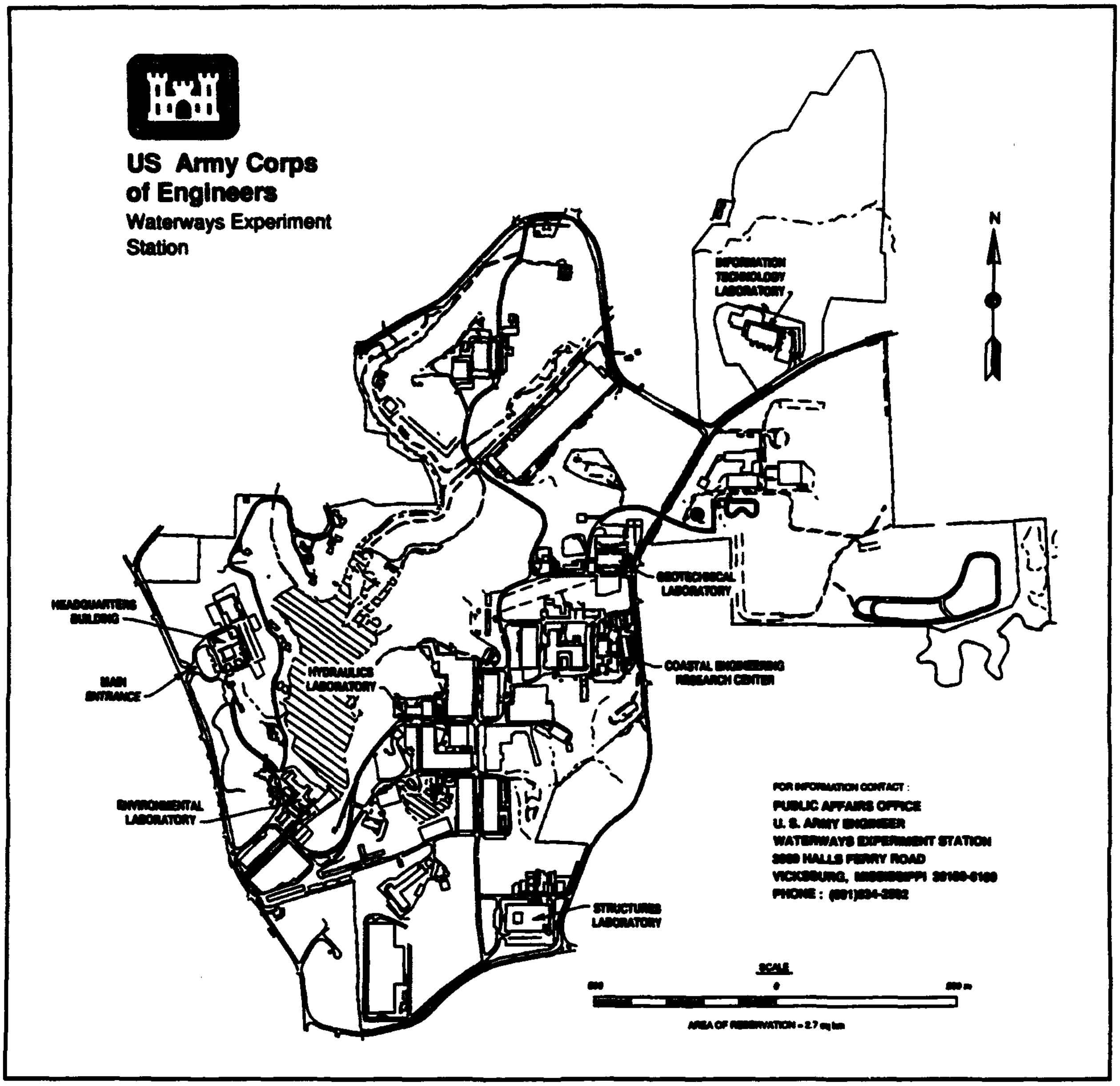
Monitored by Geotechnical Laboratory
U.S. Army Engineer Waterways Experiment Station
3909 Halls Ferry Road, Vicksburg, MS 39180-6199



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Contents

Preface

This report investigates the service life of the Craney Island Dredged Material Management Area (CIDMMA) under the proposed Restricted Use Program. The Restricted Use Program involves ocean dumping of suitable material and the other material being placed in the CIDMMA. This report assesses the service of life of the CIDMMA based on its storage capacity as predicted using the microcomputer program PCDDF89, Primary Consolidation and Desiccation of Dredged Fill. PCDDF89 performs simulations of consolidation and desiccation of dredged material for designing, maximizing, and managing the long term storage capacity of confined dredged material disposal facilities. The results of the analysis indicate that the proposed Restricted Use Program will significantly extend the service life of the CIDMMA.

This research was conducted for the U.S. Army Engineer Waterways Experiment Station (WES), Vicksburg, Mississippi, and the U.S. Army District, Norfolk (NAO), Norfolk, Virginia, during the period May 1992 to August 1992. The research was performed under Contract No. DACW39-92-M-4901 between WES and Dr. Timothy D. Stark, an Assistant Professor of Civil Engineering at the University of Illinois at Urbana-Champaign. Dr. Stark supervised the analysis and wrote this report. Mr. Ivan Contreras and Mr. Thomas A. Williamson, Graduate and Undergraduate Research Assistants, respectively, at the University of Illinois at Urbana-Champaign, performed the analysis and data reduction. General supervision in the Geotechnical Laboratory (GL), WES, was provided by Dr. Jack Fowler, Soil Mechanics Division (SMD), Mr. W. Milton Myers, Chief, Engineering Group, SMD, Dr. D. C. Banks, Chief, SMD, and Dr. W. F. Marcuson III, Director, GL.

General supervision of the study was carried out by Sam McGee, NAO, under the guidance of Mr. Ronn G. Vann, Chief, Dredging Management Branch, and Mr. James N. Thomasson, Chief, Engineering Division, NAO. Technical information was provided by Mr. M. T. Byrne, Geotechnical Branch (GB), NAO, and by Mr. D. A. Pezza, Chief, GB, NAO.

At the time of publication of this report, Director of WES was Dr. Robert W. Whalin. Commander was COL Bruce K. Howard, EN.

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Conversion Factors, Non-SI to SI Units of Measurement

Non-SI units of measurement used in this report can be converted to SI (metric) units as follows:

Multiply	By	To Obtain
acres	4,046.873	square meters
cubic yards	0.7645549	cubic meters
feet	0.3048	meters
tons (force) per square foot	95.76052	kilopascals

1 Introduction

Background

In 1981, the U.S. Army Corps of Engineers Waterways Experiment Station (WES) developed the Craney Island Management Plan (CIMP) for the U.S. Army Corps of Engineers, Norfolk District (NAO), to extend the useful life of the Craney Island Dredged Material Management Area (CIDMMA). The CIDMMA is used for disposal of maintenance and new work dredged material from the project area. The goals of the CIMP (Palermo et al. 1981) included maximization of storage capacity by dewatering and densification of the confined dredged material and maintenance of acceptable water quality of effluent. Since that time the management approach, as recommended in the CIMP has been generally implemented. With current practices, the Craney Island site is expected to reach its ultimate capacity around the year 2000 (Palermo and Schaefer 1990). However, if material suitable for ocean disposal is barged to the sea and the unsuitable material is placed in the CIDMMA, its useful life may be extended. The Norfolk District requested WES to investigate the feasibility of the proposed Restricted Use Program and the possible extension of the service life of the CIDMMA.

Objective and Scope of Work

The objective of this study is to investigate the service life of the CIDMMA under the proposed Restricted Use Program. Under this program only material unsuitable for ocean disposal will be placed in the CIDMMA. The study objective was accomplished in the following steps:

a. Available geotechnical data and disposal history of Craney Island were assembled from conferences with WES personnel, NAO personnel and from existing literature; both published and unpublished.

b. The approximate 1956 to 1992 Craney Island disposal history was established and the estimated disposal history under the proposed Restricted Use Program was estimated for use in the microcomputer program PCDDF89, Primary Consolidation and Desiccation of Dredged Fill (Stark 1991).

c. The consolidation and desiccation properties of the compressible foundation and dredged material were assembled from conferences with WES personnel, NAO personnel and from existing literature for use in PCDDF89.

d. The surface elevation of Craney Island from 1956 to 1992 was calculated using PCDDF89 and compared to field measurements to calibrate the PCDDF89 computer model and input parameters.

e. Once calibrated, the PCDDF89 model was used to estimate the service life of the CIDMMA under the proposed Restricted Use Program. This was accomplished by comparing the calculated surface elevations of the north, center, and south compartments of Craney Island to the ultimate surface elevation of el +30 ft MLW.

2 Storage Capacity of Craney Island Dredged Material Management Area Under Proposed Restricted Use Program

The storage capacity of the CIDMMA was evaluated by comparing simulations of past filling rates with field monitoring data and projections of future filling rates with the ultimate surface elevation of +30 ft MLW. The future filling rates were estimated using a mathematical model that considers both consolidation and desiccation of the dredged material and consolidation of the compressible foundation. The field monitoring data used was the average fill elevations based on the aerial surveys, as given in Table 1.

Three filling simulations were performed. First, a simulation of the filling history from 1956 to 1984 was compared to field monitoring data. This simulation served as a calibration of the PCDDF89 microcomputer model for conditions existing prior to subdivision of the site and implementation of dewatering operations as outlined in the CIMP. Second, simulations of filling history from 1984 (the time of cross dike closure) to 1992 were conducted for each of the three subcontainments. Third, simulations of projected filling rates from 1992 (McGee 1992) were used to determine the service life of the CIDMMA under the proposed Restricted Use Program. The service life is the time at which the fill elevation reaches a limit of el +30 ft MLW (Craney Island datum) in each of the three subcontainments. The elevation of +30 ft MLW was used because this is the maximum fill elevation along the west side of Craney Island. It should be noted that the maximum fill elevation along the east side of Craney Island is +36 ft MLW. Since material is pumped in on the east side, capacity could also be defined using an average surface elevation of +33 ft MLW. However, a conservative estimate of the service life is obtained if a surface elevation of +30 ft MLW is used as the maximum fill elevation.

The projected filling rates, under the proposed Restricted Use Program were estimated by NAO (McGee 1992). The following four dredging scenarios were proposed for the Restricted Use Program: (1) Baseline Maintenance

Dredging Case, (2) Worst Case Maintenance Dredging Case, (3) New Work (Deepening) Dredging Case, and (4) Long Term Maintenance Dredging Case. Analysis of the Baseline Maintenance Dredging Case, described subsequently, showed that a small amount of material would be placed in the CIDMMA under this dredging scenario and the current storage capacity would not be exceeded by the approximate year of 2130. Therefore, it was decided to combine the four dredging scenarios to determine the service life of the CIDMMA under the most extreme dredging scenario. Therefore, this report presents the PCDDF89 results for the Baseline Maintenance Dredging Case and the summation of the four dredging scenarios termed the Worst Case Dredging Scenario.

Mathematical Model

The mathematical model used for the storage capacity evaluations in this study is the Primary Consolidation and Desiccation of Dredged Fill model (PCDDF). The model was initially developed by Cargill (1985) and subsequently modified by Stark (1991). The PCDDF89 model considers consolidation and desiccation parameters for the dredged material, initial thicknesses of dredged material applied as a function of time, consolidation of foundation soils, and precipitation and evaporation rates. One of the modifications made by Stark (1991) was to account for 25 different dredged material and compressible foundation properties; therefore allowing alternating layers of different dredged fill and foundation materials to be considered. However, consolidation and desiccation data are unavailable for each layer of dredged material placed in Craney Island since 1956 and the different soil layers in the compressible foundation. Therefore, only the set of soil properties used by Palermo and Schaefer (1990) for the compressible foundation and the dredged material was used in this study.

Selection of Model Parameters

The consolidation parameters shown in Table 2 were used to evaluate the service life of the CIDMMA under the proposed Restricted Use Program. These are the same parameters used by Palermo and Schaefer (1990) and Dozier et al. (1992) for estimating the current storage capacity of Craney Island. The void ratio-effective stress and void ratio-permeability relationships were obtained from the results of self weight, large strain, and controlled rate of strain (LSCRS) consolidation tests (Cargill 1986). The self weight test yields void ratio relationships from an effective stress of approximately 10-5 tsf to 10-2 tsf and the LSCRS test provides data on the effective stress range of 10-2 tsf to 10 tsf. The results of the self weight and LSCRS tests are combined to define the void ratio relationships over the range of effective stresses encountered in a confined disposal area.

The self weight and LSCRS tests were performed on one channel sediment, four samples obtained from the disposal area (Cargill 1983), and a composite sample of the dredged material (Cargill 1985). The composite sample was used because the initial version of PCDDF (Cargill 1985) allowed only one dredged fill and foundation material type to be modeled.

Conventional odometer tests were also conducted on samples of dredged material in 1985 and 1987 to verify the self weight and LSCRS test results. The self weight, LSCRS, and odometer test results were used to develop the average void ratio relationships shown in Table 2. Field measurements are used to calibrate the input parameters so it was decided that the average void ratio relationships could be initially used. The boundary conditions used in the analysis are depicted in Figure 1. It can be seen that the site is doubly drained and the dredged material is underlain by soft marine clay. The compressible foundation option was used to model the marine clay in the analysis.

The desiccation parameters used in PCDDF89 include; rate of precipitation, a pan evaporation efficiency, a maximum crust thickness, and a drainage efficiency. The same desiccation parameters used by Palermo and Schaefer (1990) and Dozier et al. (1992) were used in this study and represent an active dewatering condition (Table 3). The precipitation and evaporation rates that were used for the simulations are shown in Table 4 and were obtained from Palermo and Schaefer (1990). The precipitation and evaporation rates were originally obtained from Brown and Thompson (1977) and National Climatic Center (1980).

Simulation of Dredged Material Disposal

Thicknesses of dredged material for each disposal operation were determined from the actual dredging volumes and the surface areas available for placement in the disposal area. NAO provided the actual disposal history at Craney Island (Table 5). Since PCDDF applies an entire lift instantaneously, the disposal history had to be subdivided and applied at the mid-point of each subdivision. The volume of in-channel material applied in each PCDDF lift is shown in Table 5. The height of each lift was obtained by dividing the in-channel disposal volume (Table 5) by the surface area of the entire site prior to subdivision. After subdivision the height of each lift was obtained by dividing the in-channel disposal volume (Table 5) by the surface area of the subcontainment being utilized. The surface area used for the entire site prior to subdivision is 2,189 acres and the areas of the north, center, and south subcontainments after subdivisions are 689, 766, and 734 acres, respectively (Pezza 1992). For example, the first in-channel disposal volume is 3,699,276 cu yd (Table 5) and the height of the first lift is 1.05 ft (Table 6) based on a storage area of 2,189 acres. In the simulation, each lift was placed at the time corresponding to the mid-point of the disposal operation except for the first lift which was placed at October, 1956 to start the simulation.

Dredged material was placed using two different filling criteria. In the Baseline Maintenance Dredging Case, dredged material was placed in a compartment until a thickness of approximately 1 ft was obtained. After reaching approximately 1 ft, dredged material was placed in the next compartment. A 1 ft lift was used to investigate the consolidation and desiccation characteristics of thin lifts. In previous years, the filling schedule involved an annual rotation of the compartments. As a result, a large amount of dredged material was usually placed in a compartment, i.e., lift thicknesses of 3 to 6 ft, which may have slowed the rate of consolidation and desiccation.

For comparison purposes, an annual rotation of the compartments was used for the Worst Case Dredging Scenario. This was due to the large quantity of material that was to be placed under the Worst Case Scenario. After the actual dredging rates for the Restricted Use Program become available, it is recommended that a PCDDF89 analysis be conducted to determine the lift thickness that maximizes the consolidation and desiccation in the three compartments.

The PCDDF89 model initiates consolidation calculations for an initial material thickness corresponding to a void ratio at zero effective stress. The in-channel disposal volumes shown in Table 6 correspond to dredged material at the in-channel void ratio. Palermo and Schaefer (1990) reported that the average in-channel void ratio of the Craney Island sediment is 5.93 and the void ratio at zero effective stress is 10.50. Therefore, the void ratio increases from 5.93 to 10.50 during dredging, which results in a significant increase in the disposal volume. Therefore, the dredged or bulked height of each lift is obtained by multiplying the in-channel disposal height by 1.66. Table 6 shows the bulked lift thicknesses and the times at which they were applied in the computer simulation for 1956 to 1984. Tables 7 through 12 show the bulked lift thicknesses and the times at which they were applied in the north, center, and south compartments for the Baseline Maintenance Dredging Case and the Worst Case Dredging Scenario, respectively. It should be noted again that the bulked lift thicknesses for the Worst Case Dredging Scenario are based on the summation of the four dredging scenarios proposed by NAO and represent an extreme worst case situation. The four dredging scenarios for the Restricted Use Program are described in the beginning of Chapter 2.

Palermo et al. (1981) tabulated the index properties of 32 samples of in-channel dredged material that were to be placed in the CIDMMA. The index properties showed that approximately 90 percent of the dredged material consisted of fine-grained material. Since coarse-grained material does not undergo consolidation, the bulked lift thickness in Table 6 were reduced by 10 percent to obtain the bulked lift thickness of fine-grained material that was placed in Craney Island.

Craney Island Filling Simulation, 1956 to 1984

Simulations for the filling history from 1956 to 1984 are shown in Figure 2. The simulation incorporated the affects of desiccation and the results are in excellent agreement with the field surface elevations. The main objective of this simulation was to calculate the void ratio and effective stress profiles in the dredged fill and compressible foundation in October, 1983 (the time of cross dike closure). For discussion purposes, the time of cross dike closure is referred to as 1984 even though the analysis used October, 1983 (Figure 2). The calculated void ratio and effective stress profiles reflect the consolidation and desiccation that occurred between 1956 and 1984 and were used as a starting point for the subsequent simulations using the restart option in PCDDF89. The excellent agreement with field surface elevations indicates that the input parameters are representative of field conditions and can be used to estimate the service life of the CIDMMA under the proposed Restricted Use Program.

Craney Island Filling Simulations, 1984 to 1992

Simulations for the filling history from 1984 to 1992 for the north, center, and south subcontainments are shown in Figures 3 through 5, respectively. The void ratio and effective stress profiles calculated in the previous simulation were input using the restart option and the surface elevation shown in Figure 2 at October, 1983 which was the starting elevation in each compartment. It can be seen from Figures 3 through 5 that the calculated surface elevations are in excellent agreement with the field data for all three subcontainments. As a result, these input parameters were used to predict the surface elevation of the CIDMMA under the Restricted Use Program.

Review of the void ratio and effective stress profiles in 1992 showed that the majority of the calculated consolidation occurred in the dredged fill. However, large excess pore-water pressures, and thus low effective stresses, were calculated in the compressible marine clay foundation (Figure 1). This suggests that the compressible foundation, which is 90 to 100 ft thick, is under-consolidated due to the large drainage path. This is in good agreement with the large excess pore-water pressures that are being measured in the compressible foundation using recently installed piezometers in the perimeter dikes. These piezometers indicate excess pore-water pressure levels in February 1991 that exceed the ground surface elevation by 25 ft in some locations.

The dissipation of these excess pore-water pressures would result in substantial consolidation settlement, and thus increased storage capacity. The installation of vertical strip drains would significantly reduce the drainage path by allowing radial, as well as vertical, flow. Radial flow will decrease the time required to consolidate the dredged fill and foundation clay and provide a rapid increase in storage capacity. Consolidation of the dredged fill and foundation clay would also cause a significant increase in the undrained shear strength of these materials. This would allow the perimeter dikes to be constructed to higher elevations without setbacks or stability berms. The height to which the dikes could be constructed after consolidation with vertical strip drains is currently being investigated. The effect of vertical strip drains on the service life of the CIDMMA is beyond the scope of this report, and thus is not included in Figures 3 through 8.

Based on the void ratio and effective stress profiles in 1992, it is proposed that vertical strip drains be installed throughout the disposal area and subsequently the perimeter dikes. The strip drains should accelerate consolidation of the foundation clay and dredged fill and allow a new disposal area to be constructed on top of the existing area (Stark and Fowler 1992). This would certainly prolong the service life of the CIDMMA and save the cost of ocean dumping. A 450 ft by 400 ft strip drain test section was completed in February 1993 in the north compartment of the CIDMMA to evaluate the effectiveness of strip drains in increasing storage capacity. Early results show that the dredged fill and foundation clay underlying the test section are undergoing substantial settlement (2 to 2.5 ft in three months). Based on the design and spacing of the strip drains, it is anticipated that consolidation, and thus settlement, will continue for an additional nine months. The results of the test section are beyond the scope of this study and will be summarized in a subsequent report. It should be noted that the effect of the strip drain test section on the storage capacity of the north compartment is not included in Figures 2 and 6.

Baseline Maintenance Filling Simulations, 1992 to 2132

The Baseline Maintenance simulations for the filling history from 1992 to 2132 under the proposed Restricted Use Program are also shown in Figures 3, 4, and 5 for the north, center, and south subcontainments, respectively. Dredged material was initially placed in the center compartment. After approximately one foot of material was placed in the center compartment, dredged material was placed in the south compartment. Placement was moved to the north cell after a one foot lift was placed in the south cell and this cycle was repeated until an elevation of +30 ft MLW was obtained in all three compartments. It can be seen from Figure 3 that the north compartment reached capacity in January, 2069. After January, 2069, all of the dredged material was placed in the center and south compartments using one foot lifts. It can be seen from Figure 4 that the center compartment reached capacity in May, 2131. After May, 2131, all of the Baseline Maintenance dredged material was placed in the south compartment, and as a result, this compartment reached capacity in May, 2132. In summary, the service life of the CIDMMA would be extended to approximately the year 2130 under the proposed Baseline Maintenance Dredging Case of the proposed Restricted Use Program.

It should be noted that the north compartment reached capacity earlier than the center and south compartments because the current surface elevation is approximately +27 ft MLW, whereas the current surface elevation in the center and south compartments is about +20 ft MLW. If the Restricted Use Program is instituted, it is recommended that some of the material projected for the north compartment be distributed to the center and south compartments. This will reduce the possibility that the north compartment will reach capacity quicker than the center and south compartments.

This analysis predicts that the CIDMMA has a service life of approximately 140 years under the Baseline Maintenance Dredging Case of the Restricted Use Program. Clearly, this prediction is a planning level estimate and should only be used to determine if the Restricted Use Program deserves further consideration. This prediction involves many assumptions that may not pertain to the CIDMMA around the year 2130. For example, the precipitation and evaporation rates will be different, which may lead to a change in the quantity and character of the dredged material and/or the desiccation rate of the confined material. The contaminants entering the Norfolk Harbor and Channels will also change, altering the quantity and character of the dredged material placed in the CIDMMA. In summary, the results of the Baseline Maintenance Dredging Case clearly show that reducing the amount of dredged material placed in Craney Island under the Restricted Use Program will significantly extend the service life of this facility.

Worst Case Filling Simulations, 1992 to 2081

The Worst Case simulations for the filling history from 1992 to 2081 under the proposed Restricted Use Program are shown in Figures 6, 7, and 8 for the north, center, and south subcontainments, respectively. It should be noted again that the volume of material placed in this scenario corresponds to a summation of the four dredging scenarios presented by NAO (McGee 1992) to simulate an extreme dredging condition.

Dredged material was placed using an annual rotation starting with the center compartment and ending with the north compartment. It can be seen from Figure 6 that the north compartment reached capacity, i.e., el +30 ft MLW, by September, 2031. After September, 2031, dredged material was placed only in the center and south compartments using an annual rotation schedule. It can be seen from Figure 8 that the south compartment reached capacity in May, 2079. After May, 2079, all dredged material was placed in the center compartment, causing this compartment to reach capacity in September, 2080. Therefore, even under the worst case dredging scenario, i.e., the summation of the four dredging cases presented by NAO, the service life of the CIDMMA will be extended to approximately the year 2080 under the proposed Restricted Use Program.

If the Restricted Use Program is instituted, it is recommended that some of the material projected for the north compartment be distributed to the center and south compartments. This will reduce the possibility that the north compartment will reach capacity quicker than the center and south compartments.

3 Conclusions and Recommendations

The service life of the CIDMMA under the proposed Restricted Use Program was evaluated by comparing simulations of past filling rates with field monitoring data and projections of future filling rates with the ultimate surface elevation of +30 ft MLW. The projected filling rates were estimated using a mathematical model that considers both consolidation and desiccation of the dredged material. Mathematical model simulations of the past filling history between 1956 and 1984 (prior to closure of cross dikes) and 1984 to 1992 (after closure) show excellent agreement with field data. These simulations served to calibrate the mathematical model for future projections of fill rates under the proposed Restricted Use Program.

Based on projections of fill rates under the Restricted Use Program, the service of the CIDMMA will be extended significantly by reducing the quantity of dredged material placed in this facility. In particular, the CIDMMA will reach capacity around the year 2130 under the Baseline Maintenance Dredging Case and near the year 2080 under the Worst Case Dredging Scenario. Clearly, these service life estimates are for planning level purposes and should only be used to determine if the proposed Restricted Use Program deserves further consideration. The prediction of these filling rates involves many assumptions that may not be applicable to the CIDMMA in the years 2130 or 2080.

Implementation of the Restricted Use Program will require a substantial amount (possibly 3 to 4 million cu yd per year) of suitable material to be ocean dumped. Ocean dumping is approximately $8 to $9 per cu yd more expensive than disposal in Craney Island. Therefore, attempting to extend the life of the CIDMMA using the current disposal plan is recommended.

It is anticipated that the service life of the CIDMMA can be extended by installing vertical strip drains to consolidate the dredged fill and foundation clay. A 450 ft by 400 ft strip drain test section was completed in February 1993 in the north compartment of the CIDMMA to evaluate the effectiveness of strip drains in increasing storage capacity. Early results show that the dredged fill and foundation clay are undergoing substantial consolidation settlement (2 to 2.5 feet in three months). This consolidation will result in increased storage capacity and an increase in undrained shear strength of the dredged fill and foundation clay. An increase in undrained shear strength should allow the perimeter dikes to be constructed to higher elevations without setbacks or stability berms. Since consolidation of the test section is projected to continue through 1993, the results and benefits of installing vertical strip drains will be summarized in a subsequent report.

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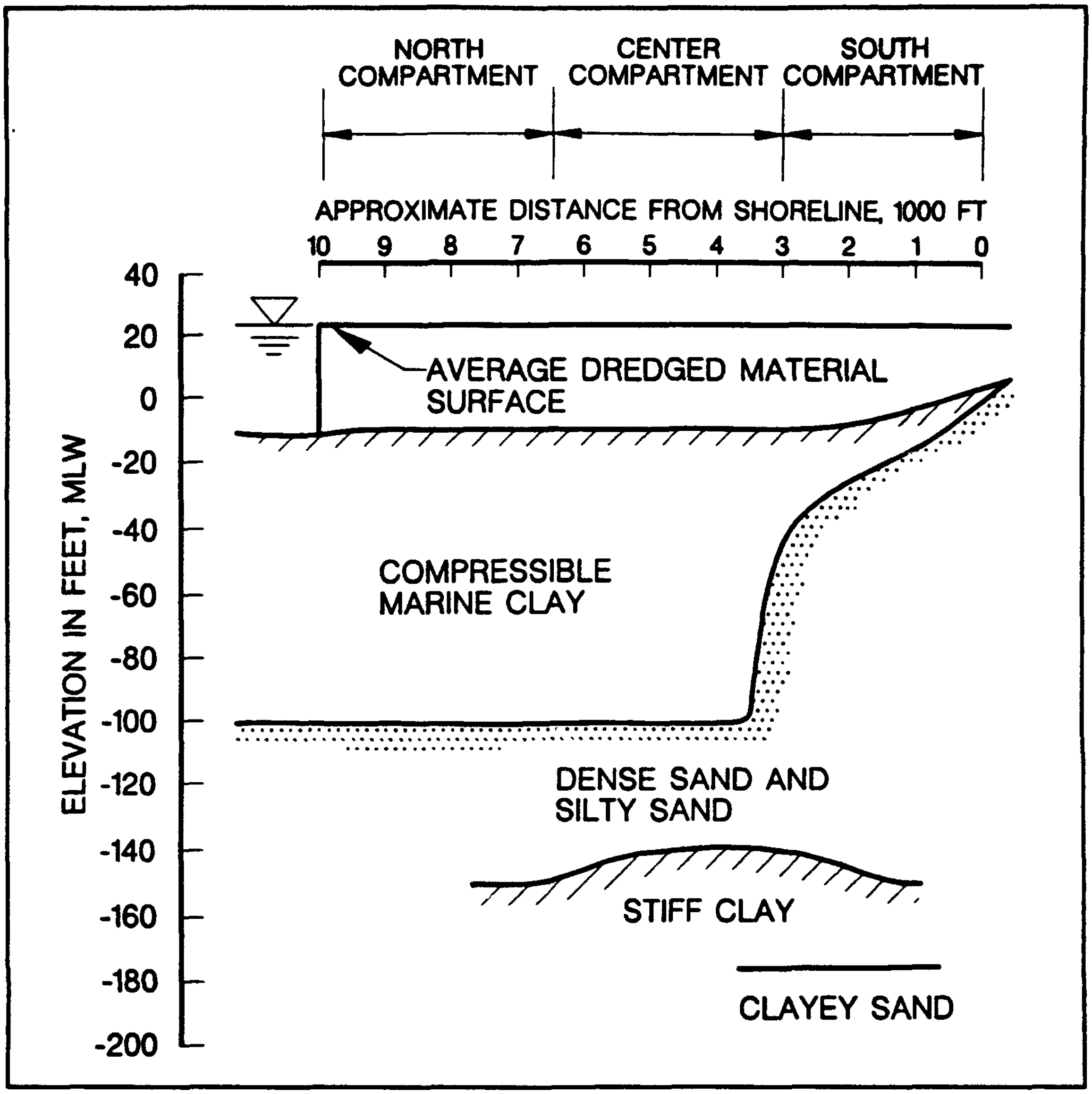

Figure 1. Generalized subsurface profile at Craney Island

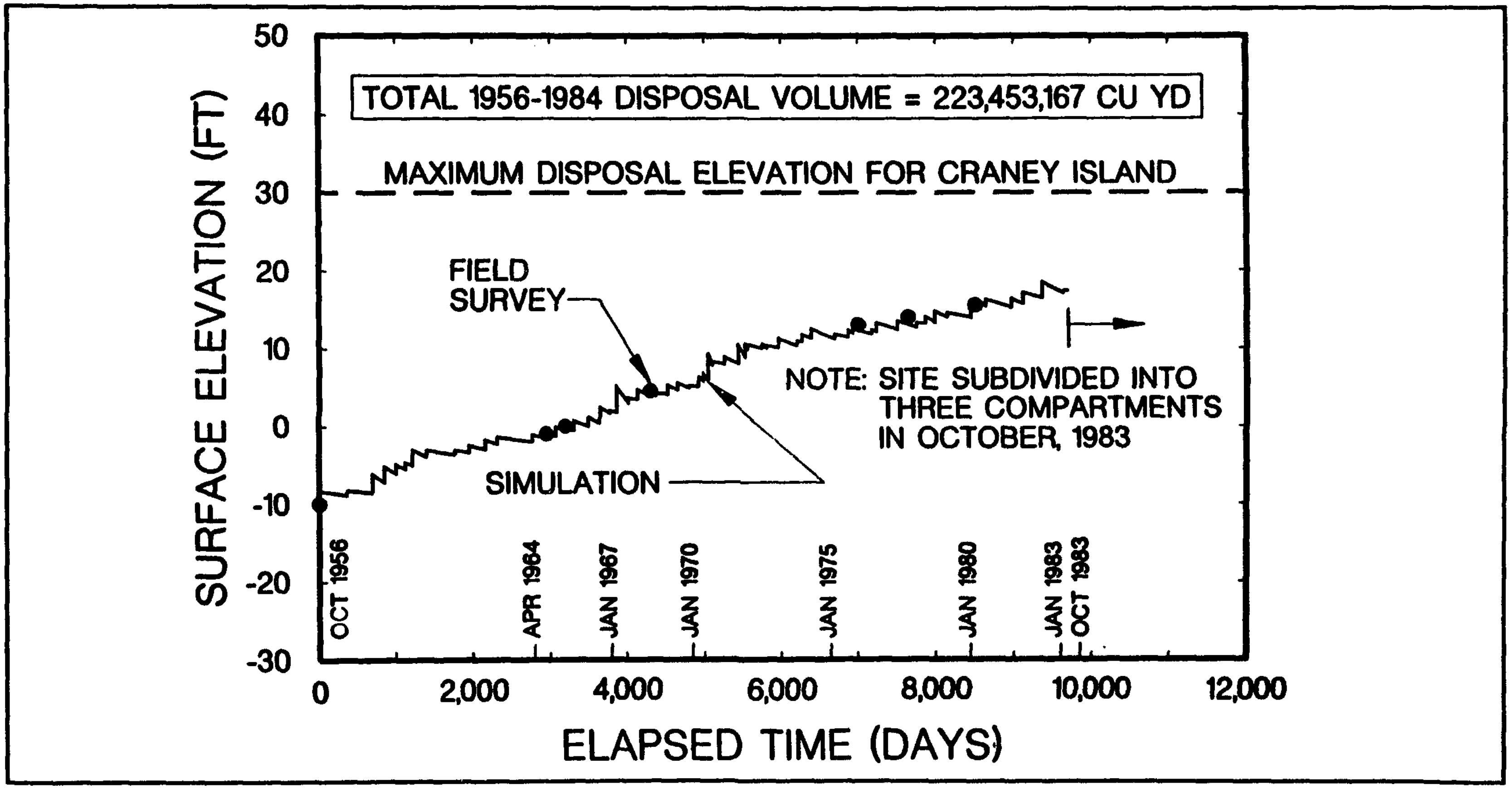

Figure 2. Fill rates for Craney Island from 1956 to 1984

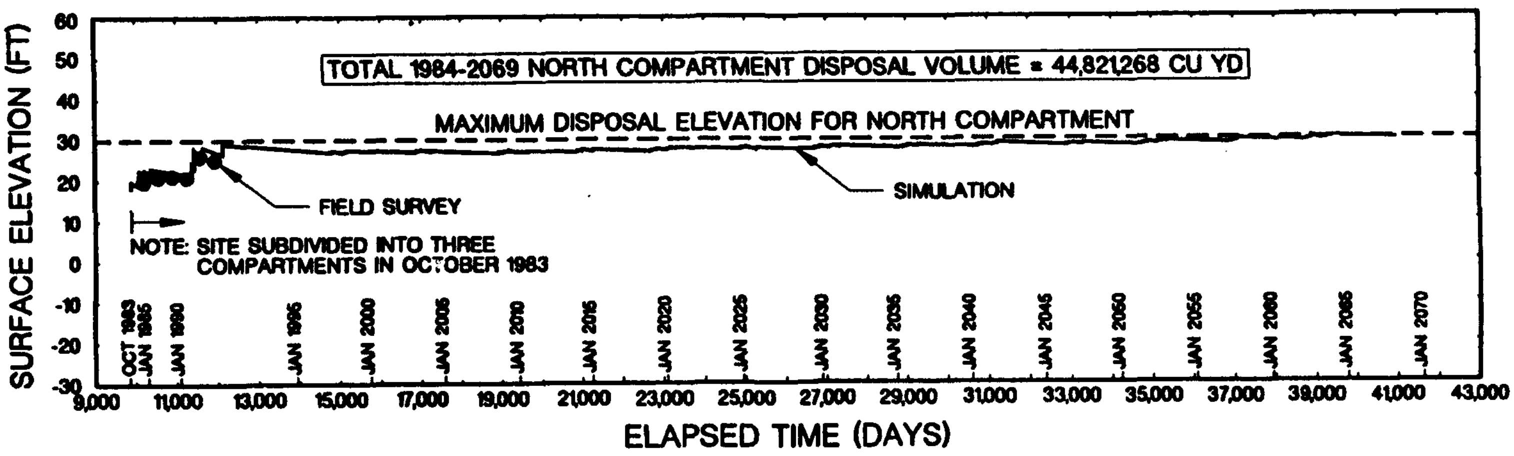

Figure 3. Simulation of fill rates for baseline maintenance dredging case in north compartment from 1984 to 2069

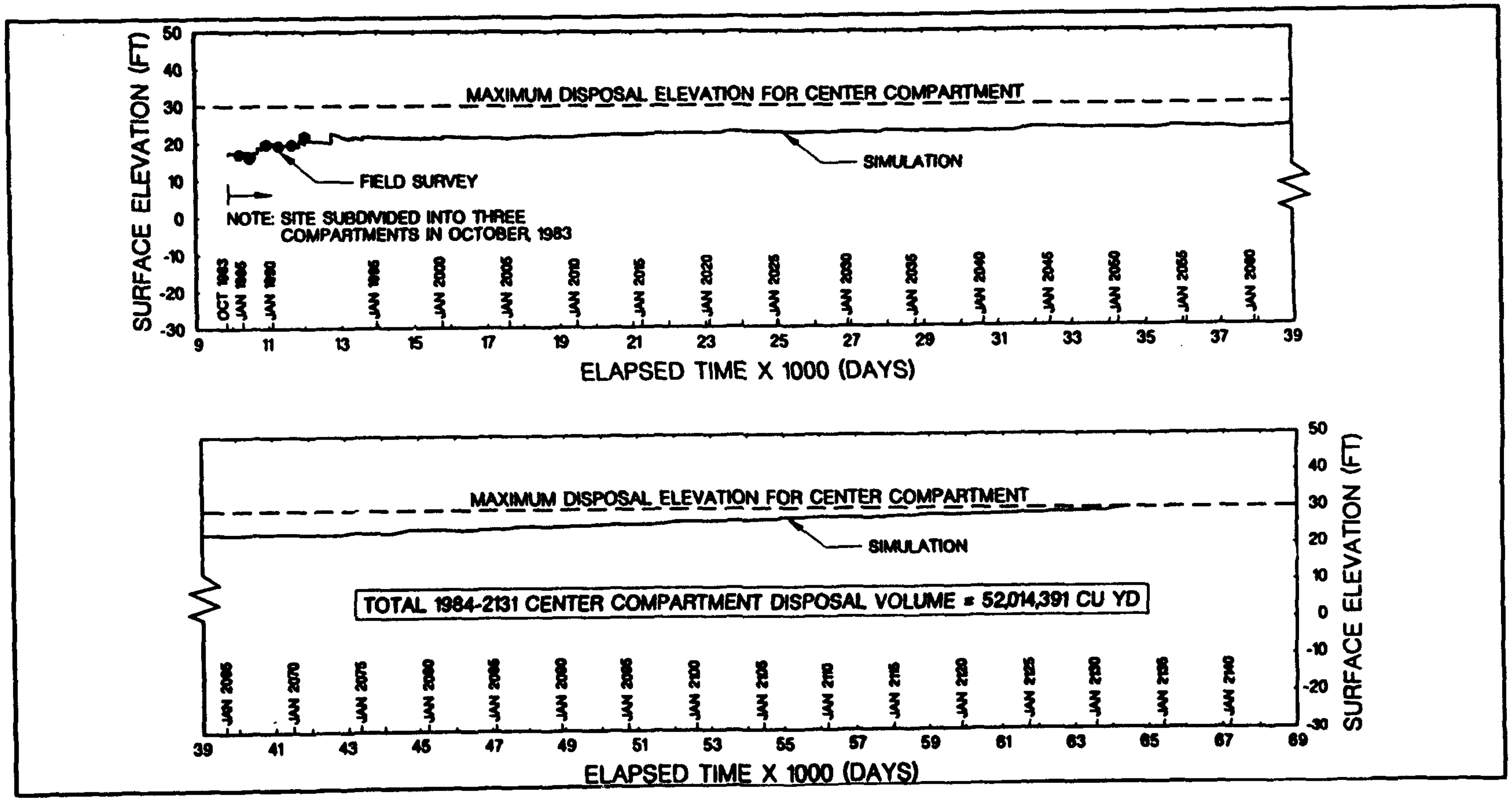

Figure 4. Simulation of fill rates for baseline dredging case in center compartment from 1984 to 2131

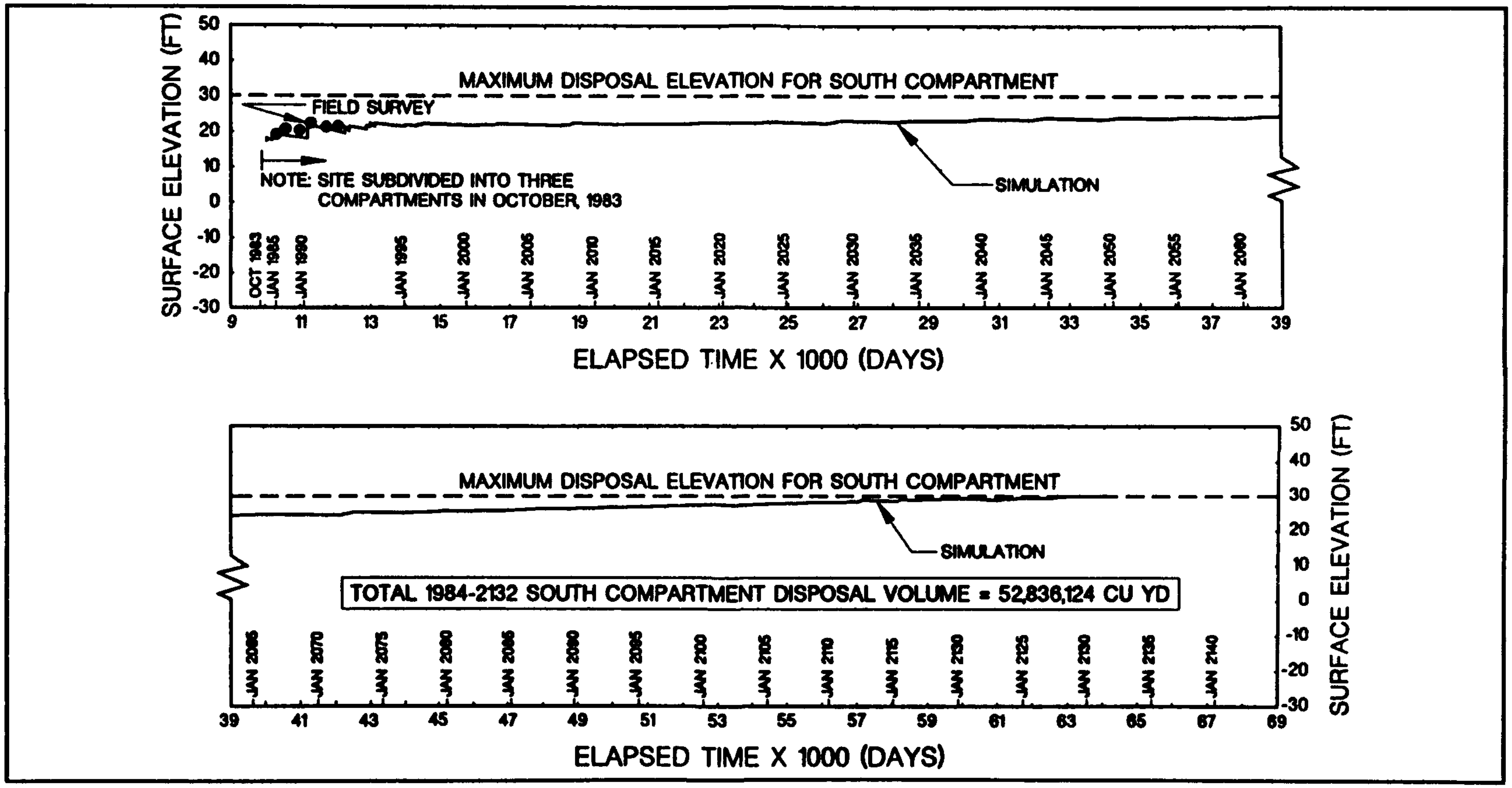

Figure 5. Simulation of fill rates for baseline maintenance dredging case in south compartment from 1984 to 2132

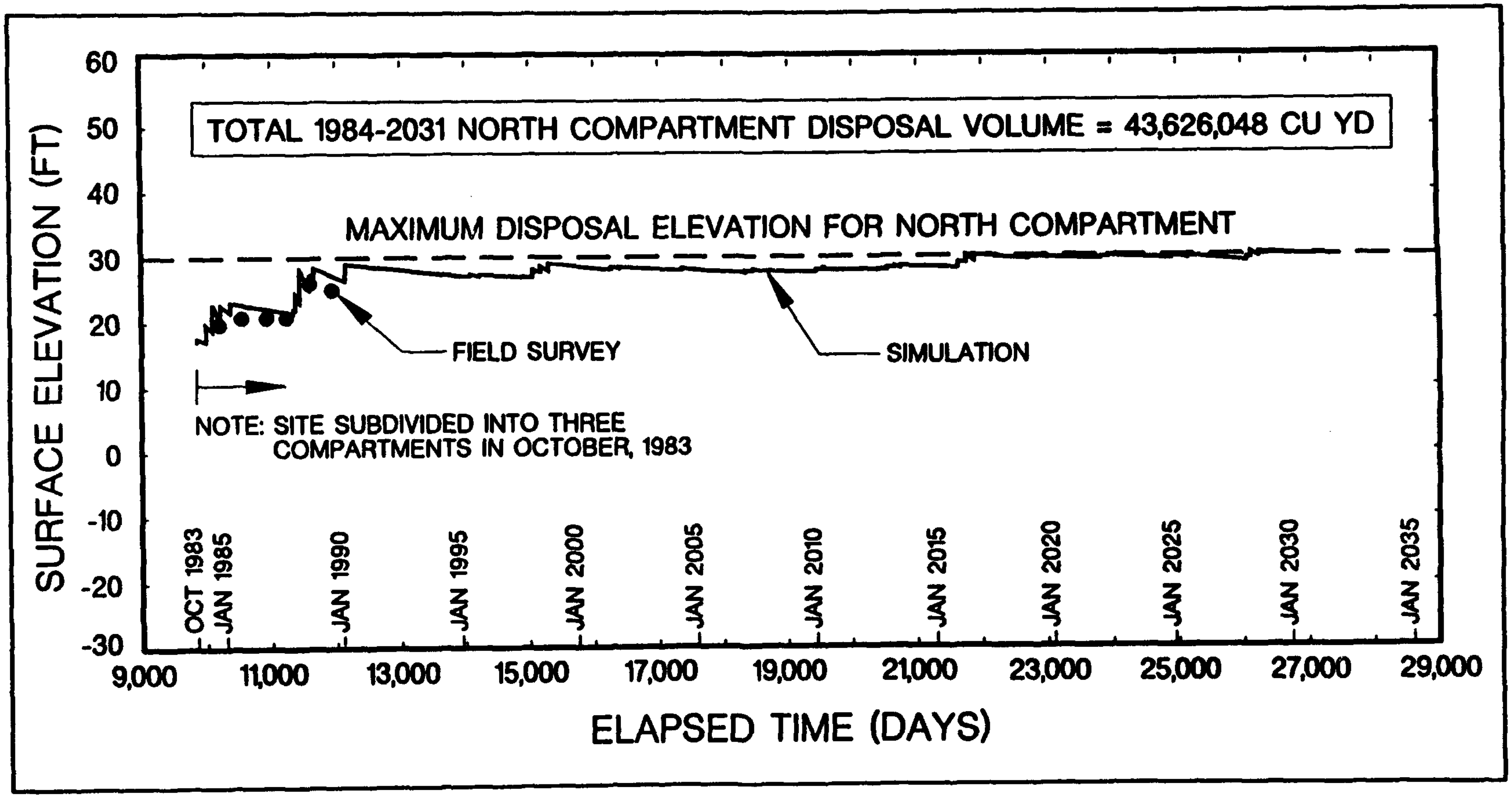

Figure 6. Simulation of fill rates for worst case dredging scenario in north compartment from 1984 to 2031

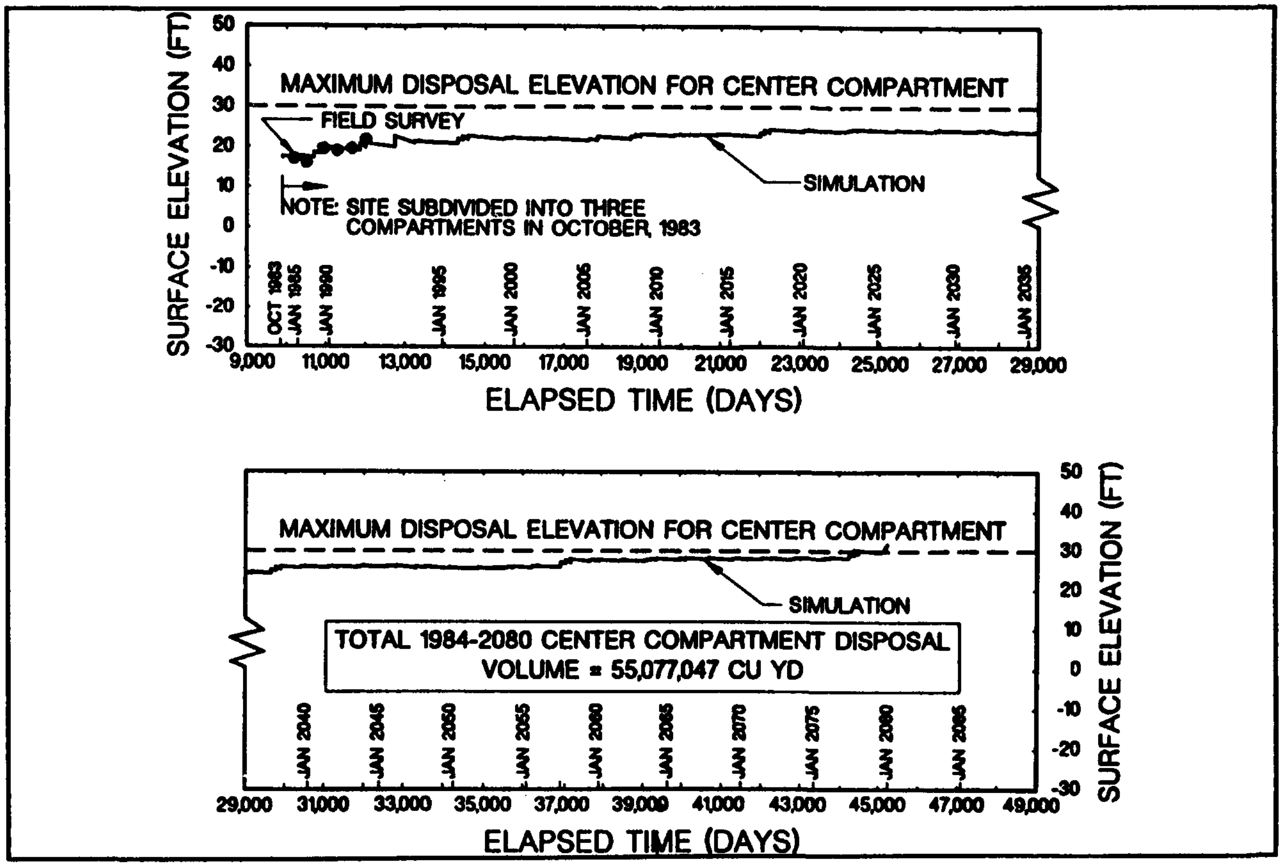

Figure 7. Simulation of fill rates for worst case scenario in center compartment from 1984 to 2080

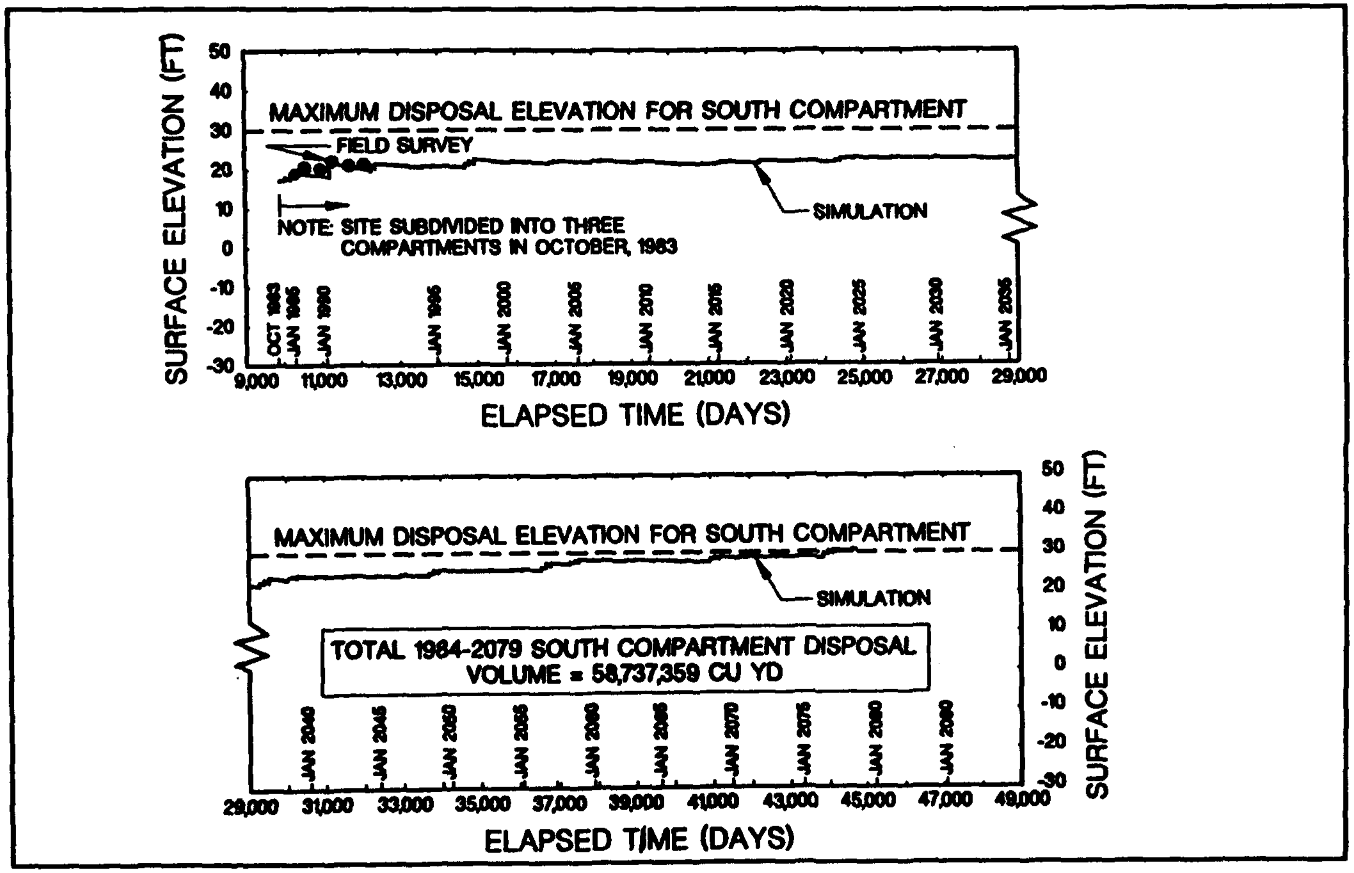

Figure 8. Simulation of fill rates for worst case scenario in south compartment from 1984 to 2079

Table 1
Average Surface Elevations (ft) Based on Aerial Surveys

Date	Entire Site Elevation[1]	North Cell Elevation[1]	Center Cell Elevation[1]	South Cell Elevation[1]
Oct-56	-10	--	--	--
Dec-64	-0.7	--	--	--
Aug-65	0.4	--	--	--
Oct-68	4.6	--	--	--
Dec-75	13.0	--	--	--
Oct-77	14.2	--	--	--
Mar-80	15.4	--	--	--
Sep-84[2]	18.39	19.13	16.95	19.10
Sep-85	18.82	19.91	16.39	20.16
Oct-86	19.90	19.95	19.71	20.03
Sep-87	20.42	20.00	19.41	21.86
Oct-88	22.17	25.8	19.50	21.10
Aug-89	22.67	24.7	21.80	21.20

[1] Reference elevation is Mean Low Water at 0 ft.
[2] Initial reading following settlement plate installation.

Table 2
Consolidation Characteristics of the Marine Clay Foundation and Dredged Material at the CIDMMA

Marine Clay Foundation			Dredged Material		
Void Ratio	Effective Stress (psf)	Permeability (ft/day)	Void Ratio	Effective Stress (psf)	Permeability (ft/day)
3.00	0.00	8.60E-04	10.50	0.00	9.36E-01
2.90	8.80	1.03E-03	10.40	0.08	8.21E-01
2.80	19.60	8.85E-04	10.20	0.15	6.62E-01
2.70	32.00	7.61E-04	10.00	0.22	5.26E-01
2.60	48.00	6.39E-04	9.80	0.30	4.18E-01
2.50	70.00	5.22E-04	9.60	0.40	3.31E-01
2.40	104.00	4.23E-04	9.40	0.50	2.59E-01
2.30	154.00	3.45E-04	9.20	0.62	2.09E-01
2.20	232.00	2.73E-04	9.00	0.76	1.66E-01
2.10	344.00	2.16E-04	8.80	0.92	1.30E-01
2.00	510.00	1.40E-04	8.60	1.10	1.05E-01
1.90	780.00	1.32E-04	8.40	1.30	8.35E-02
1.80	1,160.00	1.03E-04	8.20	1.54	6.48E-02
1.70	1,700.00	7.70E-05	8.00	1.80	5.18E-02
1.60	2,540.00	5.80E-05	7.80	2.10	4.10E-02
1.50	3,750.00	4.30E-05	7.60	2.44	3.24E-02
1.40	5,540.00	3.10E-05	7.40	2.80	2.59E-02
1.30	8,500.00	2.70E-05	7.20	3.20	2.02E-02
1.25	10,400.00	1.90E-05	7.00	3.70	1.61E-02
0.87	50,000.00	1.00E-05	6.80	4.60	1.28E-02
0.80	60,000.00	5.00E-06	6.60	5.80	1.01E-02
			6.40	7.80	7.99E-03
			6.20	10.60	6.31E-03
			6.00	14.60	5.03E-03
			5.80	20.00	3.96E-03
			5.60	28.00	3.15E-03
			5.40	39.00	2.46E-03
			5.20	55.00	1.94E-03
			5.00	75.60	1.56E-03
			4.80	105.00	1.23E-03
			4.60	139.00	9.72E-04
			4.40	183.00	7.63E-04
			4.20	240.00	6.05E-04
			4.00	316.00	4.75E-04
			3.80	618.00	2.46E-04
			3.00	1240.00	1.11E-04
			2.50	2420.00	3.80E-05
			2.00	4740.00	1.00E-05
			1.00	17000.00	5.00E-06
			0.50	60000.00	5.00E-06

Table 3
Desiccation Parameters for Filling Simulations

Parameter	Active Dewatering
Surface drainage efficiency, percent	100
Maximum evaporation efficiency, percent	100
Saturation at end of desiccation, percent	80
Maximum crust thickness, ft	1.0
Time to desiccation after filling, days	30
Elevation of fixed water table, ft MLW	1.5
Void ratio at saturation limit	6.5
Void ratio at desiccation limit	3.2
In-channel void ratio	5.93
Void ratio at zero effective stress	10.50
Void ratio of incompressible foundation sand	0.65
Permeability of incompressible foundation sand, ft/day	3.0 E-04

Table 4
Precipitation and Evaporation Rates at Craney Island Dredged Material Management Area

Month	Precipitation in.	Pan Evaporation in.	Excess Evaporation, in.	
			100-Percent Infiltration	75-Percent Infiltration
January	3.4	0.0	--	--
February	3.3	0.6	--	--
March	3.4	1.0	--	--
April	2.7	4.5	1.8	2.4
May	3.3	7.0	3.7	4.5
June	3.6	7.7	4.1	5.0
July	5.7	7.7	2.0	3.4
August	5.9	6.6	0.7	2.2
September	4.2	4.9	0.7	2.2
October	3.1	3.6	0.5	1.3
November	2.9	1.2	--	--
December	3.1	0.0	--	--
Total	44.6	44.8	13.5	21.0

Table 5
Actual Craney Island Disposal History

Location and Type	Beginning Date	Ending Date	In-Channel Volumes (cu yd) Before Dredging: USAED	Other Fed.	Commercial	Total In-Channel Disposal Volume
Permit	Oct-56	Dec-56			982,566	
RE Basin, NW	Jan-57	Aug-57	2,414,467			3,699,276
RE Basin, maint	Feb-57	May-57	302,243			
NH, maint, HD	Oct-57	Nov-57	1,468,894			1,468,894
NH, nw widen	Jul-58	Dec-58	4,708,210			5,079,300
RE Basin, maint	Jul-58	Sep-88	371,090			
NH, SB, maint & nw	Jan-59	Apr-59	5,159,218			5,159,218
NOB Approach	Jun-59	Aug-59		1,964,503		2,904,854
RE Basin, maint	Aug-59	Sep-59	940,351			
NH, maint & nm	27-Nov-59	1-Jan-60	2,099,627			2,099,627
CI ANCH, nw	25-Nov-59	22-May-60	4,643,020			
N&W Piers A&B	10-Dec-59	27-Dec-59			127,630	4,812,018
NAVY, DEGAUS	11-May-60	20-May-60		41,368		
NH, SB, maint, HD	4-Oct-60	10-Nov-60	674,431			1,717,124
RE Basin, maint	20-May-61	20-Aug-61	1,042,693			
N&W Piers, nw	2-May-61	30-Sep-61			687,634	1,505,307
D&S Piers, maint	1-Aug-61	17-Nov-61		817,673		
N&W Piers, nw	1-Oct-61	2-Mar-62			825,161	
S of N&W	24-Mar-62	2-Apr-62			119,740	2,203,431
NH, maint, HD	3-Apr-62	25-Apr-62	1,258,530			
ESCI, barge rehab	31-Aug-62	5-Sep-62			55,939	
CNN, maint, HD	5-Sep-62	22-Sep-62	766,893			
N&W Piers, maint	14-Sep-62	10-Oct-62			156,645	2,916,191
NH, maint, HD	22-Sep-62	21-Oct-62	1,910,338			
NNSY	15-Oct-62	21-Oct-62		26,376		
RE Basin, maint	5-Jan-63	1-Apr-63	795,559			
N&W Piers	11-Feb-63	24-Feb-63			67,924	1,411,402
NNSB	24-Feb-63	2-Mar-63			26,500	
NOB & D&S Piers	2-Mar-63	13-Jun-63		521,419		
NOB, maint	14-Jan-64	12-Mar-64		357,575		
NH, maint, HD	7-May-64	29-Jun-64	1,579,115			2,604,488
RE Basin, maint	2-Jun-64	30-Sep-64	603,878			
Thimble Shoals, Hd	23-Jun-64	2-Jul-64	63,920			
NOB, maint	27-Jul-64	12-Sep-64		371,275		
N&W, maint	10-Sep-64	2-Oct-64			148,853	1,124,006
RE Basin, maint	1-Oct-64	5-Jan-65	603,878			
NH 40, maint, HD	3-Mar-65	2-Jun-65	2,618,550			2,618,550
NNSY, maint, HD	14-May-65	22-May-65		107,900		
ESCI, BR	12-Jul-65	24-Jul-65			64,755	
NOB, maint	26-Jul-65	7-Oct-65		602,060		780,581
HRSD, TP	3-Aug-65	31-Aug-65			1,096	
N&W, maint	11-Sep-65	12-Sep-65			4,770	
N&W Piers, maint	8-Oct-65	12-Oct-65			28,613	
NOB, D&S Piers	10-Oct-65	7-Dec-65		466,515		2,829,068
NH45 maint, ND	3-Sep-65	1-Dec-65	2,333,940			

(Sheet 1 of 6)

Table 5 (Continued)

Location and Type	Beginning Date	Ending Date	In-Channel Volumes (cu yd) Before Dredging			
			USAED	Other Fed.	Commercial	Total In-Channel Disposal Volume
NH45, nw	23-Mar-66	30-Sep-66	2,931,330			2,931,330
CI Fuel Depot	20-Aug-66	19-Nov-66		360,815		
NH45, nw	1-Oct-66	16-Jan-67	1,465,600			
RE Basin, maint	24-Sep-66	21-Apr-67	1,032,198			4,514,798
NH45, nw	26-Oct-66	22-Dec-66	176,575			
NH40, Maint, HD	29-Oct-66	19-Dec-66	1,197,650			
N&W, nw	20-Nov-66	11-Jan-67			281,960	
PMT, VPA, ne	17-Jan-67	17-Apr-67			1,004,959	1,004,959
CNN45, nw	25-Mar-67	30-Sep-67	3,258,490			
NH45, nw	22-Apr-67	22-Aug-67	3,588,859			7,268,059
C&O, NW, nw	27-Aug-67	22-Oct-67			420,710	
CNN45, nw	1-Oct-67	11-Jan-68	1,629,245			1,629,245
ATLAS CEMENT	15-Jan-68	20-Jan-68			46,590	
NP&IA	12-Jan-68	13-Feb-68			811,471	
NOB, maint	20-Feb -68	27-Apr-68		715,366		2,598,129
NH45, maint, HD	26-Jan-68	8-Feb-68	236,247			
NH40, maint, HD	4-Feb-68	2-Mar-68	716,262			
NNSY, maint, HD	7-Feb-68	24-Feb-68		72,193		
NH45, maint	6-Apr-68	25-Jul-68	1,508,336			1,508,336
CNN45, nw	8-Sep-68	1-Oct-68	230,630			768,733
NOB & D&S Piers	14-Sep-68	28-Nov-68		538,103		
NH40&45, maint, HD	29-Jan-69	3-May-69	2,305,462			2,889,097
CI FUEL DEPOT, nw	16-Feb-69	17-Apr-69	583,635			
CNN45, nw	13-May-69	30-Dec-69	1,898,300			1,898,300
D&S Piers, maint	6-Nov-69	13-Feb-70		225,500		
NIT, VPA	6-Nov-69	18-Nov-69			115,925	522,392
N&W, maint	23-Oct-69	5-Nov-69			180,967	
NNSY, maint, HD	2-Jan-70	3-Feb-70		71,200		
NH40&45, maint	2-Jan-70	10-May-70	1,978,980			2,732,215
CNN, maint	10-May-70	16-May-70	188,610			
NP&IA	9-Jan-70	11-Feb-70			493,425	
RE Basin, maint	7-Mar-70	11-May-70	800,407			
N&W, maint	30-Mar-70	19-May-70			112,476	
DEGAUS RANGE	24-May-70	25-Aug-70		327,401		2,063,869
NOB, Pier 12	11-Jul-70	11-Aug-70		226,775		
N&W, maint	23-Sep-70	1-Oct-70			71,672	
NAVY POL, nw	1-Aug-70	22-Sep-70		525,138		
SPA, nw	31-Aug-70	30-Sep-71	8,039,700			8,039,700
CNN, maint, HD	29-Sep-70	29-Oct-70	370,690			
NIT, VPA, maint	3-Oct-70	12-Oct-70			131,988	1,392,963
NH40,maint	29-Oct-70	27-Nov-70	890,285			
NH45, maint	11-Dec-70	16-May-71	1,852,999			
EXXON Piers	13-Mar-71	19-Mar-71			50,104	2,388,278
NOB, maint	5-Apr-71	22-Jun-71		485,175		
NNA40, nw	16-Jul-71	22-Nov-71	4,828,174			5,499,376
USCG, CI CR, nw	16-Aug-71	20-Nov-71		671,202		
SPA, nw	1-Oct-71	1-Feb-72	2,679,887			3,002,276
PMT, VPA, maint	16-Oct-71	14-Nov-71			322,389	

(Sheet 2 of 6)

Table 5 (Continued)

Location and Type	Beginning Date	Ending Date	In-Channel Volumes (cu yd) Before Dredging			
			USAED	Other Fed.	Commercial	Total In-Channel Disposal Volume
N&W, maint	20-Nov-71	9-Dec-71			166,698	1,655,698
NH40&45, maint	2-Nov-71	4-Jan-72	1,489,000			
USCG, CI CR, maint	9-Feb-72	1-Aug-72		288,507		1,180,994
RE Basin, maint	25-Jun-72	19-Sep-72	892,487			
NOB & D&S Piers	8-Aug-72	5-Sep-72		239,032		
ATLAS CEMENT	6-Sep-72	11-Sep-72			23,050	868,799
NH45, maint	12-Sep-72	29-Oct-72	606,717			
NIT, VPA, nw	27-Jan-73	3-May-73			1,264,045	
NH40, maint, HD	7-Feb-73	28-Mar-73	862,800			
CNN, maint, HD	23-Feb-73	28-Mar-73	238,060			
NNSY, maint, HD	17-Feb-73	22-Mar-73		57,950		2,844,890
HRBT, VDOT, nw	27-Apr-73	5-May-73			183,406	
N&W, maint	9-May-73	23-May-73			152,170	
NNSB, maint	23-May-73	26-May-73			15,907	
C&O Piers, maint	8-Jul-73	23-Jul-73			70,552	
NNSB, nw	7-Aug-73	30-Sep-73			324,976	1,281,752
NNSB, nw	2-Oct-73	31-Dec-73			956,776	
NOB & D&S, maint	10-Oct-73	1-Apr-74		916,855		
NH40 & SB35, m, HD	13-Dec-73	29-Jan-74	852,544			1,824,222
NNSY, maint, HD	19-Dec-73	29-Dec-73		54,823		
NNSB, nw	1-Jan-74	26-May 74			659,742	
NNSB, nw	1-Jan-74	26-May-74			769,928	
PMT, VPA	9-Jun-74	22-Aug-74			674,820	2,711,229
NOB, maint	25-Jun-74	18-Sep-74		207,855		
D&S Piers, maint	19-Jul-74	9-Sep-74		199,710		
NIT, VPA, maint	8-Dec-74	24-Dec-74			199,174	
NH45, maint	29-Jan-75	16-Mar-75	1,622,300			
DEGAUS RANGE	15-Feb-75	23-Feb-75		36,825		
CARGILL GRAIN, BR	15-Feb-75	14-Mar-75			103,324	1,788,802
NNSD, maint, BR	1-Mar-75	4-Mar-75			14,625	
YELLOW RIVER (LIM)	18-Mar-75	22-Mar-75			11,728	
NNSB, maint	22-Apr-75	30-May-75			263,948	
SO. BLOCK, SB	30-May-75	1-Jun-75			7,156	
US GYPsum, SB	1-Jun-75	2-Jun-75			4,316	1,576,669
NOB, maint	28-Jun-75	16-Sep-75		530,995		
RE Basin, maint	7-Aug-75	17-Nov-75	770,254			
NH45, maint	11-Dec-70	16-May-71	1,852,999			
EXXON Piers	13-Mar-71	19-Mar-71			50,104	2,388,278
NOB, maint	5-Apr-71	22-Jun-71		485,175		
NNA40, nw	16-Jul-71	22-Nov-71	4,828,174			5,499,376
USCG, CI CR, nw	16-Aug-71	20-Nov-71		671,202		
SPA, nw	1-Oct-71	1-Feb-72	2,679,887			3,002,276
PMT, VPA, maint	16-Oct-71	14-Nov-71			322,389	
N&W, maint	20-Nov-71	9-Dec-71			166,698	1,655,698
NH40&45, maint	2-Nov-71	4-Jan-72	1,489,000			
USCG, CI CR, maint	9-Feb-72	1-Aug-72		288,507		1,180,994
RE Basin, maint	25-Jun-72	19-Sep-72	892,487			

(Sheet 3 of 6)

Table 5 (Continued)

Location and Type	Beginning Date	Ending Date	In-Channel Volumes (cu yd) Before Dredging: USAED	Other Fed.	Commercial	Total In-Channel Disposal Volume
NOB & D&S Piers	8-Aug-72	5-Sep-72		239,032		
ATLAS CEMENT	6-Sep-72	11-Sep-72			23,050	868,799
NH45, maint	12-Sep-72	29-Oct-72	606,717			
NIT, VPA, nw	27-Jan-73	3-May-73			1,264,045	
NH40, maint, HD	7-Feb-73	28-Mar-73	862,800			
CNN, maint, HD	23-Feb-73	28-Mar-73	238,060			
NNSY, maint, HD	17-Feb-73	22-Mar-73		57,950		2,844,890
HRBT, VDOT, nw	27-Apr-73	5-May-73			183,406	
N&W, maint	9-May-73	23-May-73			152,170	
NNSB, maint	23-May-73	26-May-73			15,907	
C&O Piers, maint	8-Jul-73	23-Jul-73			70,552	
NNSB, nw	7-Aug-73	30-Sep-73			324,976	1,281,752
NNSB, nw	2-Oct-73	31-Dec-73			956,776	
NOB & D&S, maint	10-Oct-73	1-Apr-74		916,855		
NH40 & SB35, m, HD	13-Dec-73	29-Jan-74	852,544			1,824,222
NNSY, maint, HD	19-Dec-73	29-Dec-73		54,823		
NNSB, nw	1-Jan-74	26-May-74			659,742	
NNSB, nw	1-Jan-74	26-May-74			769,928	
PMT, VPA	9-Jun-74	22-Aug-74			674,820	2,711,229
NOB, maint	25-Jun-74	18-Sep-74		207,855		
D&S Piers, maint	19-Jul-74	9-Sep-74		199,710		
NIT, VPA, maint	8-Dec-74	24-Dec-74			199,174	
NH45, maint	29-Jan-75	16-Mar-75	1,622,300			
DEGAUS RANGE	15-Feb-75	23-Feb-75		36,825		
CARGILL GRAIN, BR	15-Feb-75	14-Mar-75			103,324	1,788,802
NNSB, maint, BR	1-Mar-75	4-Mar-75			14,625	
YELLOW RIVER (LIM)	18-Mar-75	22-Mar-75			11,728	
NNSB, maint	22-Apr-75	30-May-75			263,948	
SO. BLOCK, SB	30-May-75	1-Jun-75			7,156	
US GYPsum, SB	1-Jun-75	2-Jun-75			4,316	1,576,669
NOB, maint	28-Jun-75	16-Sep-75		530,995		
RE Basin, maint	7-Aug-75	17-Nov-75	770,254			
NNSY, maint, HD	6-Oct-75	27-Oct-75		79,695		
NH40, maint, HD	3-Oct-75	30-Oct-75	476,270			
CNN, maint, HD	3-Oct-75	30-Oct-75	120,863			1,676,141
NNSB, nw	10-Oct-75	14-Dec-75			433,649	
C&O Coal Pier, BR	14-Dec-75	18-Dec-75			26,532	
NH45, maint	18-Nov-75	21-Jan-76	539,132			
NOB, 12, maint	8-Feb-76	13-Mar-76		386,425		
N&W, maint	7-Mar-76	6-Apr-76			102,916	
NORSHIPCO	7-Apr-76	6-Jul-76			334,220	1,458,665
NOB, 25, nw & maint	3-Jun-76	3-Jul-76		622,180		
VDOT, W NOR.BR	29-May-76	15-Jul-76			12,924	
HH45, maint	17-Jul-76	4-Oct-76	2,455,287			
N&W, maint	25-Aug-76	24-Sep-76			384,679	
NOB, Boat Basin	27-Jul-76	17-Sep-76		67,200		3,054,678
NNSB, maint	28-Nov-76	3-Jan-77			110,307	
NNSB, WAY5&6, m	23-Nov-76	30-Nov-76			37,205	

(Sheet 4 of 6)

Table 5 (Continued)						
			In-Channel Volumes (cu yd) Before Dredging			
Location and Type	Beginning Date	Ending Date	USAED	Other Fed.	Commercial	Total In-Channel Disposal Volume
C&O Coal Pier	14-Feb-77	20-Feb-77			20,045	
VDOT, JRB	14-Feb-77	20-Feb-77			6,071	
NNSY, maint, BR	8-Feb-77	23-Feb-77		39,645		
NOB, 20, maint	12-Feb-77	4-May-77		528,325		
NNSB, nw, BR	26-Apr-77	17-Jun-77			333,900	
SPA, maint	5-May-77	20-Jun-77	743,476			2,128,608
Vdot, JRB	6-May-77	21-May-77			5,528	
WILLOUGHBY BAY	18-May-77	20-May-77	2,400			
DEGAUS RANGE	21-May-77	21-Jun-77		130,480		
Deep CR, NN, m, BR	25-Jun-77	15-Jul-77	42,862			
NORSHIPCO	1-Oct-77	25-Jan-78			222,230	
NNSB, W EXT, nw	17-Dec-77	31-Dec-77			53,646	
NOB, 2&4, maint	30-Jan-78	21-Feb-78		211,245		
RE Basin, maint	21-Feb-78	5-Jan-79	1,231,637			1,746,668
NH40&SB35, m, HD	2-Mar-78	29-Mar-78	303,786			
NIT, VPA, nw	15-Mar-78	13-Aug-78			954,180	
CNN, maint, HD	16-Mar-78	1-Apr-78	129,160			
CNG, nw, BR	21-Mar-78	14-May-78			108,389	1,683,809
NOB, 12, maint	4-Apr-78	1-Jun-78		345,990		
NOB, 12, nw	4-Apr-78	1-Jun-78		146,090		
Fuel Line Trench	12-May-78	11-Jun-78		8,458		
C&O Pier14, BR	24-May-78	10-Jun-78			59,400	
NIT, VPA, maint	3-Jun-78	7-Jul-78			457,370	
NH45, maint	6-Jun-78	1-Nov-78	2,147,368			3,827,548
ERT, maint, BR	12-Jun-78	15-Jun-78			2,250	
PMT, VPA, nw	15-Jun-78	17-Nov-78			601,176	
EXXON PIER	15-Oct-78	24-Oct-78			76,091	
NOB, Pier24, nw	12-Dec-78	14-Feb-79		475,435		
NOB, D&S Piers	6-Jan-79	20-Mar-79		337,630		
YORKTOWN NWS, HD	2-Jan-79	6-Mar-79		400,971		
NIT, VPA, maint	15-Jul-79	29-Jul-79			111,255	1,155,299
VDOT, JRB, nw	16-Oct-79	24-Oct-79			9,068	
Deep CR, NN, maint	25-Oct-79	18-Jan-80	296,375			
SPA, maint	15-Aug-79	18-Nov-79	1,477,626			
NH45, maint	10-Nov-79	18-Jun-80	2,016,563			3,698,196
NOB, Piers, m	21-Nov-79	22-Feb-80		204,007		
NNA, maint	12-Apr-80	29-May-80	1,087,166			
NOB, 3-7, 22, 25m	21-Apr-80	18-Jun-80		407,375		1,884,245
CONT Grain, nw & m	17-Jun-80	6-Aug-80			159,350	
N&W, nw & m	7-Jul-80	2-Aug-80			230,354	
NOB, 12, maint	12-Aug-80	3-Sep-80		251,738		
RE Basin, maint	20-Feb-80	14-Oct-80	1,637,381			1,929,034
NOB, 7, maint	4-Sep-80	6-Sep-80		25,092		
NIT, VPA, maint	19-Feb-80	22-Feb-80			14,823	
NOB, AFDL, maint	12-May-81	5-Jul-81		247,155		
NOB Piers, maint	23-Jul-81	14-Nov-81		651,882		
CI Fuel Depot, m	14-Sep-81	14-Oct-81		35,997		3,259,134
NH45, maint	14-Sep-81	22-Jan-82	2,228,076			
N&W, maint	19-Nov-81	1-Dec-81			96,024	
RE Basin, maint	9-Jan-82	30-Sep-82	1,414,988			
CNN, maint	24-Apr-82	23-Jun-82	648,722			3,285,339
DOMINION TER, nw	25-Jul-82	30-Sep-82			330,000	
NOB, maint	22-Jan-82	19-Mar-82		891,629		

(Sheet 5 of 6)

Table 5 (Concluded)

Location and Type	Beginning Date	Ending Date	In-Channel Volumes (cu yd) Before Dredging: USAED	Other Fed.	Commercial	Total In-Channel Disposal Volume
RE Basin, maint DOMINION TER, nw NH45, maint NOB Piers, maint	1-Oct-82 1-Oct-82 14-Nov-82 28-Sep-82	8-Jun-83 9-Jun-83 24-May-83 11-Apr-83	1,414,988 2,183,692	366,479	989,925	4,955,084
NOB, ADFL, maint NIT, VPA, maint	3-May-83 12-Jun-83	24-May-83 5-Jul-83		114,005	392,148	506,153
NOB Piers, maint NH45, maint	19-Oct-83 6-Apr-84	6-Nov-83 N* 30-Sep-84 N	1,752,340	363,098		2,115,438
NOB Pier 11, m SPA, maint	22-May-84 4-Feb-84	6-Jul-84 N 29-Sep-84 N	2,451,377	469,639		2,921,016
NH45, maint NOB Piers, maint N&W, maint	1-Oct-84 16-Sep-84 23-Oct-84	14-Dec-84 N 28-Nov-84 N 24-Nov-84 N	876,171	775,448	121,457	1,773,076
NNA, maint, HD NOB Piers, maint EXXON PIERS, maint LEHIGH CEMENT, m NNA, maint	2-Feb-85 7-Mar-85 16-May-85 22-May-85 31-Jul-85	7-Mar-85 N 1-May-85 N 22-May-85 N 24-May-85 N 11-Aug-85 N	183,546	610,386 251,987	77,150 45,400	1,168,469
	1-Nov-87	17-Nov-87 N	280,615			280,615
	1-Dec-87	30-Mar-88 N	1,770,000			1,770,000
	1-Oct-87	18-Jul-88 N	3,412,714			3,412,714
	7-Aug-88 1-May-88 5-Jul-88	15-Sep-88 N 20-Jul-88 N 30-Sep-88 N	624,764 616,387 540,586			1,781,737
	1-May-88	3-Dec-88 N	1,590,267			1,590,267
Rehandling Basin	11-Jan-90	26-Apr-90 N	1,838,231			1,838,231
NIT, maint & nw	3-Feb-85	2-Apr-85 C			600,095	600,095
	7-Jan-86 2-Feb-86	19-Mar-86 C 22-Mar-86 C	997,142 150,431			1,147,573
	22-May-86 1-Jun-86	22-Jun-86 C 22-Jun-86 C	1,618,841 185,365			1,804,206
	15-Jul-86 15-Jul-86	14-Aug-86 C 30-Aug-86 C	192,055 529,325			721,380
	19-Apr-89 15-Apr-89	25-May-89 C 30-Jun-89 C	1,353,460 103,610			1,457,070
	16-Aug-89	31-Oct-89 C	916,834			916,834
Norfolk Harbor	1-Aug-91	29-Dec-91 C	2,068,369			2,068,369
RE Basin, maint	1-Apr-84	30-Sep-84 S	869,433			869,433
RE Basin, maint	1-Oct-84	16-May-85 S	1,391,094			1,391,094
	9-Jun-87 20-Jun-87 8-May-87	1-Aug-87 S 8-Aug-86 S 23-Aug-87 S	978,250 153,474 1,681,024			2,812,748
RE Basin, maint US NAVY	19-Apr-89 15-Apr-89	25-May-89 S 30-Jun-89 S	1,353,460	103,610		1,457,070
NH45&50, maint	16-Aug-89	31-Oct-89 S	916,834			916,834

(Sheet 6 of 6)

* Site Subdivided Oct. 1983, N = North Compartment, C = Center Compartment, S = South Compartment.

Table 6
Approximated Disposal History in Craney Island Dredged Material Management Area from 1956 to 1984

Date	Elapsed Time (Days)	In-Channel Disposal Volume (cu yd)	In-Channel Disposal Height (ft)	Desiccation Start Time	Month Desiccation Starts	Bulked Disposal Height (ft)
Oct 1956	0	3,699,276	1.05	N/A[1]	N/A[1]	1.74
Oct 1957	365	1,468,894	0.42	365	9	0.63
Sep 1958	695	5,079,300	1.44	695	9	2.15
Feb 1959	850	5,159,218	1.46	1,000	6	2.18
Jul 1959	1,000	2,904,854	0.82	1,000	6	1.22
Nov 1959	1,120	2,099,627	0.59	1,120	11	0.88
Feb 1960	1,215	4,812,018	1.36	1,395	6	2.03
Jul 1960	1,395	1,717,124	0.49	1,395	6	0.73
Aug 1961	1,760	1,505,307	0.43	1,760	8	0.64
Feb 1962	1,945	2,203,431	0.62	2,095	6	0.93
Sep 1962	2,155	2,916,191	0.83	2,155	9	1.24
Feb 1963	2,310	1,411,402	0.4	2,430	6	0.60
May 1964	2,765	2,604,488	0.74	2,795	6	1.10
Oct 1964	2,915	1,124,006	0.32	2,915	10	0.48
Mar 1965	3,070	2,618,550	0.74	3,160	6	1.10
Jul 1965	3,195	780,581	0.22	3,195	7	0.33
Nov 1965	3,315	2,829,068	0.8	3,315	11	1.19
May 1966	3,495	2,931,330	0.83	3,525	6	1.24
Oct 1966	3,645	4,514,798	1.28	3,645	10	1.91
Feb 1967	3,770	1,004,959	0.28	3,890	6	0.42
May 1967	3,860	7,268,059	2.06	3,890	6	3.08
Oct 1967	4,010	1,629,245	0.46	4,010	10	0.69
Feb 1968	4,135	2,598,129	0.72	4,255	6	1.07
Jun 1968	4,255	1,508,336	0.43	4,255	6	0.64
Oct 1968	4,375	768,733	0.22	4,375	10	0.33
Mar 1969	4,530	2,889,097	0.82	4,620	6	1.22
Aug 1969	4,650	1,898,300	0.54	4,650	8	0.81
Dec 1969	4,800	522,392	0.15	4,800	12	0.22
Apr 1970	4,925	2,732,215	0.77	4,985	6	1.15
Jun 1970	4,985	2,063,869	0.58	4,985	6	0.87
Aug 1970	5,045	8,039,700	2.28	5,045	8	3.40

(Continued)

Table 6 (Concluded)

Date	Elapsed Time (Days)	In-Channel Disposal Volume (cu yd)	In-Channel Disposal Height (ft)	Desiccation Start Time	Month Desiccation Starts	Bulked Disposal Height (ft)
Oct 1970	5,105	1,392,963	0.39	5,105	10	0.58
Mar 1971	5,260	2,388,278	0.68	5,350	6	1.02
Sep 1971	5,440	5,499,376	1.56	5,440	9	2.33
Dec 1971	5,530	3,002,276	0.85	5,530	12	1.27
Jan 1972	5,565	1,655,698	0.47	5,715	6	0.70
Jul 1972	5,745	1,180,994	0.33	5,745	7	0.49
Sep 1972	5,805	868,799	0.25	5,805	9	0.37
Feb 1973	5,960	2,844,890	0.81	6,080	6	1.21
Oct 1973	6,200	1,281,752	0.36	6,200	10	0.54
Dec 1973	6,260	1,824,222	0.52	6,260	12	0.78
Apr 1974	6,385	2,711,229	0.77	6,445	6	1.15
Feb 1975	6,690	1,788,802	0.51	6,810	6	0.76
Aug 1975	6,870	1,576,669	0.45	6,870	8	0.67
Oct 1975	6,930	1,676,141	0.47	6,930	10	0.70
Jun 1976	7,175	1,458,665	0.41	7,175	6	0.61
Aug 1976	7,235	3,054,678	0.86	7,235	8	1.28
May 1977	7,510	2,128,608	0.60	7,540	6	0.90
Jan 1978	7,755	1,746,668	0.49	7,905	6	0.73
May 1978	7,875	1,683,809	0.48	7,905	6	0.72
Sep 1978	7,992	3,827,548	1.08	7,995	9	1.61
Feb 1979	8,150	1,155,299	0.33	8,270	6	0.49
Nov 1979	8,450	3,698,196	1.05	8,450	11	1.57
Apr 1980	8,575	1,884,245	0.53	8,635	6	0.79
Jun 1980	8,635	1,929,034	0.55	8,635	6	0.82
May 1981	8,970	3,259,134	0.92	9,000	6	1.37
Oct 1981	9,120	3,285,339	0.93	9,120	10	1.39
Jun 1982	9,365	4,955,084	1.40	9,365	6	2.09
Mar 1983	9,640	506,153	0.14	9,730	6	0.21

[1] N/A = Not Required in PCDDF Analysis.
Total In-Channel Disposal Volume = 149,567,046 cu yd.
Total CIDMMA Disposal Volume = 233,453,167 cu yd.

Table 7
Approximated Disposal History for Baseline Maintenance Dredging Case in North Compartment from 1984 to 2069

Date	Elapsed Time (Days)	In-Channel Disposal Volume (cu yd)	In-Channel Disposal Height (ft)	Desiccation Start Time	Month Desiccation Starts	Initial Disposal Thickness at Craney Island (ft)
Jan 1984	9,945	2,115,438	1.89	10,095	6	2.83
Jun 1984	10,095	2,921,016	2.61	10,095	6	3.90
Oct 1984	10,215	1,773,076	1.59	10,215	10	2.38
Mar 1985	10,370	1,168,469	1.05	10,460	6	1.57
Mar 1985	10,370	1,168,469	1.05	10,460	6	1.57
Nov 1987	11,340	280,615	0.24	11,340	11	0.35
Dec 1987	11,370	1,770,000	1.59	11,370	12	2.38
Feb 1988	11,435	3,412,000	3.06	11,555	6	4.57
Jul 1988	11,585	1,781,737	1.59	11,585	7	2.37
Sep 1988	11,645	1,590,267	1.41	11,645	8	2.11
Jan 1990	12,135	1,838,231	1.65	12,285	6	2.47
Baseline Maintenance Dredging Case in Restricted Use Program (McGee 1992)						
Jan 1997	14,690	200,000	0.18	14,840	6	0.27
May 1997	14,810	200,000	0.18	14,480	6	0.27
Jan 1998	15,055	200,000	0.18	15,205	6	0.27
May 1998	15,175	200,000	0.18	15,205	6	0.27
Jan 2003	16,880	200,000	0.18	17,030	6	0.27
May 2003	17,000	200,000	0.18	17,030	6	0.27
Sep 2003	17,120	200,000	0.18	17,120	9	0.27
Jan 2004	17,245	200,000	0.18	17,395	6	0.27
Jan 2008	18,945	250,000	0.22	18,945	6	0.34
Jan 2009	19,070	166,666	0.15	19,220	6	0.22
May 2009	19,190	166,666	0.15	19,220	6	0.22
Sep 2009	19,310	166,666	0.15	19,310	9	0.22
Sep 2013	20,740	200,000	0.18	20,740	9	0.27
Jan 2014	20,895	200,000	0.18	21,045	6	0.27
May 2014	21,015	200,000	0.18	21,045	6	0.27
Jan 2015	21,260	200,000	0.18	21,410	6	0.27
Jan 2019	22,720	200,000	0.18	22,870	6	0.27
May 2019	22,840	200,000	0.18	22,870	6	0.27
Sep 2024	24,785	200,000	0.18	24,785	9	0.27
Jan 2025	24,910	200,000	0.18	25,060	6	0.27
May 2025	25,030	200,000	0.18	25,060	6	0.27
Jan 2026	25,275	200,000	0.18	25,425	6	0.27
Jan 2030	26,735	200,000	0.18	26,885	6	0.27
May 3030	26,855	200,000	0.18	26,885	6	0.27
Jan 2031	27,100	200,000	0.18	27,250	6	0.27

(Continued)

Table 7 (Concluded)						
Date	Elapsed Time (Days)	In-Channel Disposal Volume (cu yd)	In-Channel Disposal Height (ft)	Desiccation Start Time	Month Desiccation Starts	Initial Disposal Thickness at Craney Island (ft)
Jan 2036	28,925	200,000	0.18	29,075	6	0.27
May 2036	29,045	200,000	0.18	29,075	6	0.27
Jan 2037	29,290	200,000	0.18	29,440	6	0.27
Jan 2041	30,750	200,000	0.18	30,900	6	0.27
May 2041	30,870	200,000	0.18	30,900	6	0.27
Jan 2042	31,115	200,000	0.18	31,265	6	0.27
May 2042	31,235	200,000	0.18	31,265	6	0.27
May 2046	32,695	200,000	0.18	32,725	6	0.27
Jan 2047	32,940	200,000	0.18	33,090	6	0.27
May 2047	33,060	200,000	0.18	33,090	6	0.27
Jan 2048	33,305	200,000	0.18	33,455	6	0.27
Jan 2052	34,765	200,000	0.18	34,915	6	0.27
May 2052	34,885	200,000	0.18	34,915	6	0.27
Jan 2053	35,130	200,000	0.18	35,280	6	0.27
May 2053	35,250	200,000	0.18	35,280	6	0.27
Sep 2057	35,370	200,000	0.18	35,370	9	0.27
Jan 2058	36,955	325,000	0.29	37,105	6	0.44
May 2058	37,075	325,000	0.29	37,105	6	0.44
Jan 2063	38,780	300,000	0.27	38,930	6	0.40
May 2063	38,900	300,000	0.27	38,930	6	0.40
Jan 2064	39,145	200,000	0.18	39,295	6	0.27
May 2068	39,265	225,000	0.20	40,755	6	0.30
Sep 2068	39,385	225,000	0.20	39,385	9	0.30
Jan 2069	40,970	500,000	0.45	41,120	6	0.67

Total In-Channel Disposal Volume for North Compartment = 30,000,847 cu yd.
Total CIDMMA Disposal Volume in North Compartment = 44,821,268 cu yd.

Table 8
Approximated Disposal History for Baseline Maintenance Dredging Case in Center Compartment from 1984 to 2131

Date	Elapsed Time (Days)	In-Channel Disposal Volume (cu yd)	In-Channel Disposal Height (ft)	Desiccation Start Time	Month Desiccation Starts	Initial Disposal Thickness at Craney Island (ft)
Mar 1985	10,370	600,095	0.48	10,460	6	0.72
Feb 1986	10,705	1,147,573	0.93	10,825	6	1.39
Jun 1986	10,825	1,804,206	1.46	10,825	6	2.18
Aug 1986	10,885	721,380	0.58	10,885	8	0.87
Apr 1989	11,860	1,457,070	1.17	11,920	6	1.74
Sep 1989	12,010	916,834	0.74	12,010	9	1.11
Sep 1991	12,470	2,068,369	1.67	12,740	9	2.44
Baseline Maintenance Dredging Case in Restricted Use Program (McGee 1992)						
Jan 1993	13,230	200,000	0.16	13,380	6	0.24
May 1993	13,350	200,000	0.16	13,380	6	0.24
Sep 1993	13,470	200,000	0.16	13,470	9	0.24
Jan 1994	13,595	300,000	0.24	13,745	6	0.36
Sep 1998	15,295	250,000	0.20	15,295	9	0.30
Jan 1999	15,420	200,000	0.16	15,570	6	0.24
May 1999	15,540	200,000	0.16	15,570	6	0.24
Jan 2000	15,785	300,000	0.24	15,935	6	0.36
May 2004	17,365	200,000	0.16	17,395	6	0.24
Jan 2005	17,610	200,000	0.16	17,760	6	0.24
May 2005	17,730	200,000	0.16	17,760	6	0.24
Jan 2006	17,975	200,000	0.16	18,125	6	0.24
May 2006	18,095	200,000	0.16	18,125	6	0.24
Jan 2010	19,435	200,000	0.16	19,585	6	0.24
May 2010	19,555	200,000	0.16	19,585	6	0.24
Jan 2011	19,800	200,000	0.16	19,950	6	0.24
May 2011	19,920	200,000	0.16	19,950	6	0.24
Jan 2015	21,260	200,000	0.16	21,410	6	0.24
Jan 2016	21,625	200,000	0.16	21,775	6	0.24
May 2016	21,745	200,000	0.16	21,775	6	0.24
Jan 2017	21,990	200,000	0.16	22,140	6	0.24
Jan 2021	23,450	200,000	0.16	23,600	6	0.24
May 2021	23,570	200,000	0.16	23,600	6	0.24
Jan 2022	23,815	200,000	0.16	23,965	6	0.24
May 2022	23,935	200,000	0.16	23,965	6	0.24
May 2026	25,395	200,000	0.16	25,425	6	0.24
Jan 2027	25,640	200,000	0.16	25,790	6	0.24
May 2027	25,760	200,000	0.16	25,790	6	0.24

(Sheet 1 of 4)

Table 8 (Continued)

Date	Elapsed Time (Days)	In-Channel Disposal Volume (cu yd)	In-Channel Disposal Height (ft)	Desiccation Start Time	Month Desiccation Starts	Initial Disposal Thickness at Craney Island (ft)
Jan 2028	26,005	300,000	0.24	26,155	6	0.36
Jan 2032	27,465	200,000	0.16	27,615	6	0.24
May 2032	27,585	200,000	0.16	27,615	6	0.24
Jan 2033	27,830	200,000	0.16	27,980	6	0.24
May 2033	27,950	200,000	0.16	27,980	6	0.24
Jan 2037	29,290	200,000	0.16	29,440	6	0.24
Jan 2038	29,655	216,666	0.14	29,805	6	0.26
May 2038	29,775	216,666	0.14	29,805	6	0.26
Sep 2038	29,895	216,666	0.14	29,895	9	0.26
Jan 2043	31,480	200,000	0.16	31,630	6	0.24
May 2043	31,600	200,000	0.16	31,630	6	0.24
Sep 2043	31,720	200,000	0.16	31,720	9	0.24
Jan 2044	31,845	200,000	0.16	31,995	6	0.24
May 2084	33,425	225,000	0.18	33,455	6	0.27
Sep 2048	33,545	225,000	0.18	33,545	9	0.27
Jan 2049	33,670	166,666	0.13	33,820	6	0.20
May 2049	33,790	166,666	0.13	33,820	6	0.20
Sep 2049	33,910	166,666	0.13	33,910	9	0.20
Sep 2053	35,370	200,000	0.16	35,370	9	0.24
Jan 2054	35,495	200,000	0.16	35,645	6	0.24
May 2054	35,615	200,000	0.16	35,645	6	0.24
Jan 2055	35,860	200,000	0.16	36,010	6	0.24
Jan 2059	37,320	200,000	0.16	37,470	6	0.24
May 2059	37,440	200,000	0.16	37,470	6	0.24
Jan 2060	37,685	200,000	0.16	37,835	6	0.24
May 2060	37,805	200,000	0.16	37,836	6	0.24
May 2064	39,265	200,000	0.16	39,295	6	0.24
Jan 2065	39,510	200,000	0.16	39,660	6	0.24
May 2065	39,630	200,000	0.16	39,660	6	0.24
Jan 2066	39,875	200,000	0.16	40,025	6	0.24
Jan 2070	41,335	200,000	0.16	41,485	6	0.24
May 2070	41,455	200,000	0.16	41,485	6	0.24
Jan 2071	41,700	200,000	0.16	41,850	6	0.24
May 2071	41,820	200,000	0.16	41,850	6	0.24
Jan 2074	42,795	200,000	0.16	42,945	6	0.24
May 2074	42,915	200,000	0.16	42,945	6	0.24
Jan 2075	43,160	200,000	0.16	43,310	6	0.24
May 2075	43,280	200,000	0.16	43,310	6	0.24

(Sheet 2 of 4)

Table 8 (Continued)						
Date	Elapsed Time (Days)	In-Channel Disposal Volume (cu yd)	In-Channel Disposal Height (ft)	Desiccation Start Time	Month Desiccation Starts	Initial Disposal Thickness at Craney Island (ft)
Jan 2078	11,255	325,000	0.26	44,405	6	0.39
May 2078	44,375	325,000	0.26	44,405	6	0.39
Jan 2079	44,620	200,000	0.16	44,770	6	0.24
May 2079	44,740	200,000	0.16	44,770	6	0.24
Jan 2082	45,715	200,000	0.16	45,865	6	0.24
May 2082	45,835	200,000	0.16	45,865	6	0.24
Jan 2083	46,080	300,000	0.24	46,230	6	0.36
May 2083	46,200	300,000	0.24	46,230	6	0.36
Jan 2086	47,175	200,000	0.16	47,325	6	0.24
May 2086	47,295	200,000	0.16	47,325	6	0.24
Jan 2087	47,540	200,000	0.16	47,690	6	0.24
May 2087	57,660	200,000	0.16	47,690	6	0.24
Jan 2090	48,635	200,000	0.16	48,785	6	0.24
May 2090	48,755	200,000	0.16	48,785	6	0.24
Jan 2091	49,000	200,000	0.16	49,150	6	0.24
May 2091	49,120	200,000	0.16	49,150	6	0.24
Jan 2094	50,095	200,000	0.16	50,245	6	0.24
May 2094	50,215	200,000	0.16	50,245	6	0.24
Jan 2095	50,460	200,000	0.16	50,610	6	0.24
May 2095	50,580	200,000	0.16	50,610	6	0.24
Jan 2098	51,555	325,000	0.26	51,705	6	0.39
May 2098	51,675	325,000	0.26	51,705	6	0.39
Jan 2099	51,920	200,000	0.16	52,070	6	0.24
May 2099	52,040	200,000	0.16	52,070	6	0.24
Jan 2102	53,015	200,000	0.16	53,165	6	0.24
May 2102	53,135	200,000	0.16	53,165	6	0.24
Jan 2103	53,380	300,000	0.24	53,530	6	0.36
May 2103	53,500	300,000	0.24	53,530	6	0.36
Jan 2106	54,475	200,000	0.16	54,625	6	0.24
May 2106	54,595	200,000	0.16	54,625	6	0.24
Jan 2107	54,840	200,000	0.16	54,990	6	0.24
Jan 2107	54,960	200,000	0.16	54,990	6	0.24
Jan 2110	55,935	200,000	0.16	56,085	6	0.24
May 2110	56,055	200,000	0.16	56,085	6	0.24
Jan 2111	56,300	200,000	0.16	56,450	6	0.24
May 2111	56,420	200,000	0.16	56,450	6	0.24
Jan 2114	57,395	200,000	0.16	57,545	6	0.24
May 2114	57,515	200,000	0.16	57,545	6	0.24

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Table 8 (Concluded)						
Date	Elapsed Time (Days)	In-Channel Disposal Volume (cu yd)	In-Channel Disposal Height (ft)	Desiccation Start Time	Month Desiccation Starts	Initial Disposal Thickness at Craney Island (ft)
Jan 2115	57,760	200,000	0.16	57,910	6	0.24
May 2115	57,880	200,000	0.16	57,910	6	0.24
Jan 2118	58,855	325,000	0.26	59,005	6	0.39
May 2118	58,975	325,000	0.26	59,005	6	0.39
Jan 2119	59,220	200,000	0.16	59,370	6	0.24
May 2119	29,340	200,000	0.16	59,370	6	0.24
Jan 2122	60,315	200,000	0.16	60,465	6	0.24
May 2122	60,435	200,000	0.16	60,465	6	0.24
Jan 2123	60,680	300,000	0.24	60,830	6	0.36
May 2123	60,800	300,000	0.24	60,830	6	0.36
Jan 2126	64,775	200,000	0.16	61,925	6	0.24
May 2126	64,895	200,000	0.16	61,925	6	0.24
Jan 2127	62,140	200,000	0.16	62,290	6	0.24
May 2127	62,260	200,000	0.16	62,290	6	0.24
Jan 2130	63,235	200,000	0.16	63,385	6	0.24
Jan 2130	63,355	200,000	0.16	63,385	6	0.24
Jan 2131	63,600	200,000	0.16	63,750	6	0.24
May 2131	63,720	200,000	0.16	63,750	6	0.24

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Total In-Channel Disposal Volume for Center Compartment = 34,815,523 cu yd.
Total CIDMMA Disposal Volume in Center Compartment = 52,014,391 cu yd.

Table 9
Approximated Disposal History for Baseline Maintenance Dredging Case in South Compartment from 1984 to 2132

Date	Elapsed Time (Days)	In-Channel Disposal Volume (cu yd)	In-Channel Disposal Height (ft)	Desiccation Start Time	Month Desiccation Starts	Initial Disposal Thickness at Craney Island (ft)
Apr 1984	10,035	869,433	0.73	10,095	6	1.09
Sep 1984	10,185	1,391,094	1.17	10,185	9	1.75
Jun 1987	11,190	2,812,748	2.37	11,190	6	3.54
May 1989	12,255	1,457,070	1.23	12,285	6	1.84
Sep 1989	12,375	916,834	0.77	12,375	9	1.16
Jan 1992	12,865	689,456	0.58	13,015	6	0.88
May 1992	12,985	689,456	0.58	13,015	6	0.88
Sep 1992	13,105	689,456	0.58	13,015	9	0.88
Baseline Maintenance Dredging Case in Restricted Use Program (McGee 1992)						
May 1994	13,715	100,000	0.08	13,745	6	0.13
Jan 1995	13,960	200,000	0.17	14,110	6	0.25
May 1995	14,080	200,000	0.17	14,110	6	0.25
Jan 1996	14,325	200,000	0.17	14,475	6	0.25
May 1996	14,445	200,000	0.17	14,475	6	0.26
May 2000	15,905	100,000	0.08	15,935	6	0.13
Jan 2001	16,150	200,000	0.17	16,300	6	0.25
May 2001	16,270	200,000	0.17	16,300	6	0.25
Jan 2002	16,515	200,000	0.17	16,665	6	0.25
May 2002	16,635	200,000	0.17	16,665	6	0.25
Jan 2007	18,340	200,000	0.17	18,490	6	0.25
May 2007	18,460	200,000	0.17	18,490	6	0.25
Jan 2008	18,705	200,000	0.17	18,855	6	0.25
May 2008	18,825	200,000	0.17	18,855	6	0.25
Jan 2012	20,165	200,000	0.17	20,315	6	0.25
May 2012	20,285	200,000	0.17	20,315	6	0.25
Jan 2013	20,530	200,000	0.17	20,680	6	0.25
May 2013	20,650	200,000	0.17	20,680	6	0.25
May 2017	22,110	200,000	0.17	22,140	6	0.25
Jan 2018	22,355	216,666	0.18	22,505	6	0.27
May 2018	22,475	216,666	0.18	22,505	6	0.27
Sep 2018	22,595	216,666	0.18	22,595	9	0.27
Jan 2023	24,180	200,000	0.17	24,330	6	0.25
May 2023	24,300	200,000	0.17	24,330	6	0.25
Sep 2023	24,420	200,000	0.17	24,420	9	0.25
Jan 2024	24,545	200,000	0.17	24,695	6	0.25
May 2028	26,125	175,000	0.15	26,155	6	0.22

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Table 9 (Continued)						
Date	Elapsed Time (Days)	In-Channel Disposal Volume (cu yd)	In-Channel Disposal Height (ft)	Desiccation Start Time	Month Desiccation Starts	Initial Disposal Thickness at Craney Island (ft)
Sep 2028	26,245	175,000	0.15	26,155	9	0.22
Jan 2029	26,370	250,000	0.21	26,520	6	0.32
May 2029	26,490	250,000	0.21	26,520	6	0.32
Sep 2033	28,070	200,000	0.17	28,070	9	0.26
Jan 2034	28,195	200,000	0.17	28,345	6	0.26
May 2034	28,315	200,000	0.17	28,345	6	0.25
Jan 2035	28,560	200,000	0.17	28,710	6	0.25
Jan 2039	30,020	200,000	0.17	30,170	6	0.25
May 2039	30,140	200,000	0.17	30,170	6	0.25
Jan 2040	30,385	200,000	0.17	30,535	6	0.25
May 2040	30,505	200,000	0.17	30,535	6	0.25
May 2044	31,965	200,000	0.17	31,995	6	0.25
Jan 2045	32,210	200,000	0.17	32,360	6	0.25
May 2045	32,330	200,000	0.17	32,360	6	0.25
Jan 2046	32,575	200,000	0.17	32,725	6	0.25
Jan 2050	34,035	200,000	0.17	34,185	6	0.25
May 2050	34,155	200,000	0.17	34,185	6	0.25
Jan 2051	34,400	200,000	0.17	34,554	6	0.25
May 2051	34,520	200,000	0.17	34,550	6	0.25
May 2055	35,980	200,000	0.17	36,010	6	0.25
Jan 2056	36,225	200,000	0.17	36,375	6	0.25
May 2056	36,345	200,000	0.17	36,375	6	0.25
Jan 2057	36,590	200,000	0.17	36,740	6	0.25
Jan 2061	38,050	200,000	0.17	38,200	6	0.25
May 2061	38,170	200,000	0.17	38,200	6	0.25
Jan 2062	38,415	200,000	0.17	38,565	6	0.25
May 2062	38,535	200,000	0.17	38,565	6	0.25
May 2066	39,995	200,000	0.17	40,025	6	0.25
Jan 2067	40,240	200,000	0.17	40,390	6	0.25
May 2067	40,360	200,000	0.17	40,390	6	0.25
Jan 2068	40,605	200,000	0.17	40,755	6	0.25
Jan 2072	42,065	200,000	0.17	42,215	6	0.25
May 2072	42,185	200,000	0.17	42,215	6	0.25
Jan 2073	42,430	200,000	0.25	42,580	6	0.38
May 2073	42,550	200,000	0.25	42,580	6	0.38
Jan 2076	43,525	200,000	0.17	43,675	6	0.25
May 2076	43,645	200,000	0.17	43,675	6	0.25
Jan 2077	43,890	200,000	0.17	44,040	6	0.25

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Table 9 (Continued)						
Date	Elapsed Time (Days)	In-Channel Disposal Volume (cu yd)	In-Channel Disposal Height (ft)	Desiccation Start Time	Month Desiccation Starts	Initial Disposal Thickness at Craney Island (ft)
May 2077	44,010	200,000	0.17	44,040	6	0.25
Jan 2080	44,985	200,000	0.17	45,135	6	0.25
May 2080	45,105	200,000	0.17	45,135	6	0.25
Jan 2081	45,350	200,000	0.17	45,500	6	0.25
May 2081	45,470	200,000	0.17	45,500	6	0.25
Jan 2084	46,445	200,000	0.17	46,595	6	0.25
May 2084	46,565	200,000	0.17	46,595	6	0.25
Jan 2085	46,810	200,000	0.17	46,960	6	0.25
May 2085	46,930	200,000	0.17	46,960	6	0.25
Jan 2088	47,905	325,000	0.27	48,055	6	0.41
May 2088	48,025	325,000	0.27	48,055	6	0.41
Jan 2089	48,270	250,000	0.21	48,420	6	0.32
May 2089	48,390	250,000	0.21	48,420	6	0.32
Jan 2092	49,365	250,000	0.21	49,515	6	0.32
May 2092	49,485	250,000	0.21	49,515	6	0.32
Jan 2093	49,730	300,000	0.25	49,880	6	0.38
May 2093	49,850	300,000	0.25	49,880	6	0.38
Jan 2096	50,825	200,000	0.17	50,975	6	0.25
May 2096	50,945	200,000	0.17	50,975	6	0.25
Jan 2097	51,190	200,000	0.17	51,340	6	0.25
May 2097	51,310	200,000	0.17	51,340	6	0.25
Jan 2100	52,285	200,000	0.17	52,435	6	0.25
May 2100	52,405	200,000	0.17	52,435	6	0.25
Jan 2101	52,650	200,000	0.17	52,800	6	0.25
May 2101	52,770	200,000	0.17	52,800	6	0.25
Jan 2104	53,745	200,000	0.17	53,895	6	0.25
May 2104	53,865	200,000	0.17	53,895	6	0.25
Jan 2105	54,110	200,000	0.17	54,260	6	0.25
May 2105	54,230	200,000	0.17	54,260	6	0.25
Jan 2108	55,205	325,000	0.27	55,355	6	0.41
May 2108	55,325	325,000	0.27	55,355	6	0.41
Jan 2109	55,570	250,000	0.21	55,720	6	0.32
May 2109	55,690	250,000	0.21	55,720	6	0.32
Jan 2112	56,665	250,000	0.21	56,815	6	0.32
May 2112	56,785	250,000	0.21	56,815	6	0.32
Jan 2113	57,030	300,000	0.25	57,180	6	0.38
May 2113	57,150	300,000	0.25	57,180	6	0.38
Jan 2116	58,125	200,000	0.17	58,275	6	0.25

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Table 9 (Concluded)

Date	Elapsed Time (Days)	In-Channel Disposal Volume (cu yd)	In-Channel Disposal Height (ft)	Desiccation Start Time	Month Desiccation Starts	Initial Disposal Thickness at Craney Island (ft)
May 2116	58,245	200,000	0.17	58,275	6	0.25
Jan 2117	58,490	200,000	0.17	58,640	6	0.25
May 2117	58,610	200,000	0.17	58,640	6	0.25
Jan 2120	59,585	200,000	0.17	59,735	6	0.25
May 2120	59,705	200,000	0.17	59,735	6	0.25
Jan 2121	59,950	200,000	0.17	60,100	6	0.25
May 2121	60,070	200,000	0.17	60,100	6	0.25
Jan 2124	61,045	200,000	0.17	61,195	6	0.25
May 2124	61,165	200,000	0.17	61,195	6	0.25
Jan 2125	61,410	200,000	0.17	61,560	6	0.25
May 2125	61,530	200,000	0.17	61,560	6	0.25
Jan 2128	62,505	325,000	0.27	62,655	6	0.41
May 2128	62,625	325,000	0.27	62,655	6	0.41
Jan 2129	62,870	250,000	0.21	63,020	6	0.32
May 2129	62,990	250,000	0.21	63,020	6	0.32
Jan 2132	63,965	250,000	0.21	64,115	6	0.32
May 2132	64,085	250,000	0.21	64,115	6	0.32

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Total In-Channel Disposal Volume for South Compartment = 35,365,545 cu yd.
Total CIDMMA Disposal Volume in South Compartment = 52,836,124 cu yd.

Table 10
Approximated Disposal History for Worst Case Dredging Scenario in North Compartment from 1984 to 2031

Date	Elapsed Time (Days)	In-Channel Disposal Volume (cu yd)	In-Channel Disposal Height (ft)	Desiccation Start Time	Month Desiccation Starts	Initial Disposal Thickness at Craney Island (ft)
Jan 1984	9,945	2,115,438	1.89	10,095	6	2.83
Jun 1984	10,095	2,921,016	2.61	10,095	6	3.90
Oct 1984	10,215	1,773,076	1.59	10,215	10	2.38
Mar 1985	10,370	1,168,469	1.05	10,460	6	1.57
Nov 1987	11,340	280,615	0.24	11,340	11	0.35
Dec 1987	11,370	1,770,000	1.59	11,370	12	2.38
Feb 1988	11,425	3,412,000	3.06	11,555	6	4.57
Jul 1988	11,585	1,781,737	1.59	11,585	7	2.37
Sep 1988	11,645	1,590,267	1.41	11,645	8	2.11
Jan 1990	12,135	1,838,231	1.65	12,285	6	2.47
Worst Case Dredging Scenario in Restricted Use Program (McGee 1992)						
Jan 1995	13,960	200,000	0.17	14,110	6	0.25
May 1995	14,080	200,000	0.17	14,110	6	0.25
Sep 1995	14,230	200,000	0.17	14,230	9	0.25
Jan 1998	15,055	766,666	0.69	15,205	6	1.03
May 1998	15,175	766,666	0.69	15,205	6	1.03
Sep 1998	15,295	766,666	0.69	15,295	9	1.03
Jan 2001	16,150	133,333	0.12	16,300	6	0.18
May 2001	16,270	133,333	0.12	16,300	6	0.18
Sep 2001	16,390	133,333	0.12	16,390	9	0.18
Jan 2004	17,245	133,333	0.12	17,395	6	0.18
May 2004	17,365	133,333	0.12	17,395	6	0.18
Sep 2004	17,485	133,333	0.12	17,485	9	0.18
Jan 2007	18,340	133,333	0.12	18,490	6	0.18
May 2007	18,460	133,333	0.12	18,490	6	0.18
Sep 2007	18,580	133,333	0.12	18,580	9	0.18
Jan 2010	19,435	133,333	0.12	19,585	6	0.18
May 2010	19,555	266,666	0.24	19,585	6	0.36
Jan 2013	20,530	200,000	0.17	20,680	6	0.25
May 2013	20,650	200,000	0.17	20,680	6	0.25
Sep 2013	20,740	200,000	0.17	20,740	9	0.25
Jan 2016	21,625	766,666	0.69	21,775	6	1.03
May 2016	21,745	766,666	0.69	21,775	6	1.03
Sep 2016	21,865	766,666	0.69	21,865	9	1.03
Jan 2019	22,720	133,333	0.12	22,870	6	0.18
May 2019	27,840	133,333	0.12	22,870	6	0.18

(Continued)

Table 10 (Concluded)						
Date	Elapsed Time (Days)	In-Channel Disposal Volume (cu yd)	In-Channel Disposal Height (ft)	Desiccation Start Time	Month Desiccation Starts	Initial Disposal Thickness at Craney Island (ft)
Sep 2019	22,960	133,333	0.12	22,960	9	0.18
Jan 2022	23,815	133,333	0.12	23,965	6	0.18
May 2022	23,935	133,333	0.12	23,965	6	0.18
Sep 2022	24,055	133,333	0.12	24,055	9	0.18
Jan 2025	24,910	133,333	0.12	25,060	6	0.18
May 2025	25,030	133,333	0.12	25,060	6	0.18
Sep 2025	25,150	133,333	0.12	25,150	9	0.18
Jan 2028	26,005	516,666	0.46	26,155	6	0.69
May 2028	26,125	516,666	0.46	26,155	6	0.69
Sep 2028	26,245	516,666	0.46	26,245	9	0.69
Jan 2031	27,100	133,333	0.12	27,250	6	0.18
May 2031	27,220	133,333	0.12	27,250	6	0.18
Sep 2031	27,340	133,333	0.12	27,340	9	0.18

Total In-Channel Disposal Volume for South Compartment = 29,200,835 cu yd.
Total CIDMMA Disposal Volume in South Compartment = 43,626,048 cu yd.

Table 11
Approximated Disposal History for Worst Case Dredging Scenario in Center Compartment from 1984 to 2080

Date	Elapsed Time (Days)	In-Channel Disposal Volume (cu yd)	In-Channel Disposal Height (ft)	Desiccation Start Time	Month Desiccation Starts	Initial Disposal Thickness at Craney Island (ft)
Mar 1985	10,370	600,095	0.48	10,460	6	0.72
Feb 1986	10,705	1,147,573	0.93	10,825	6	1.39
Jun 1986	10,825	1,804,206	1.46	10,825	6	2.18
Aug 1986	10,885	721,380	0.58	10,885	8	0.87
Apr 1989	11,860	1,457,070	1.17	11,920	6	1.74
Sep 1989	12,010	916,834	0.74	12,010	9	1.11
Sep 1991	12,470	2,068,369	1.67	12,740	9	2.44
Worst Case Dredging Scenario in Restricted Use Program (McGee 1992)						
Jan 1993	13,320	200,000	0.16	13,380	6	0.24
May 1993	13,350	200,000	0.16	13,380	6	0.24
Sep 1993	13,470	200,000	0.16	13,470	9	0.24
Jan 1996	14,325	766,666	0.62	14,475	6	0.93
May 1996	14,445	766,666	0.62	14,475	6	0.93
Sep 1996	14,565	766,666	0.62	14,565	9	0.93
Jan 1999	15,420	133,333	0.11	15,570	6	0.16
May 1999	15,540	133,333	0.11	15,570	6	0.16
Sep 1999	15,660	133,333	0.11	15,660	9	0.16
Jan 2002	16,515	133,333	0.11	16,665	6	0.16
May 2002	16,635	133,333	0.11	16,665	6	0.16
Sep 2002	16,755	133,333	0.11	16,755	9	0.16
Jan 2005	17,610	133,333	0.11	17,760	6	0.16
May 2005	17,730	133,333	0.11	17,760	6	0.16
Sep 2005	17,850	133,333	0.42	17,850	9	0.63
Jan 2008	18,750	516,667	0.42	18,855	6	0.63
May 2008	18,825	516,667	0.42	18,855	6	0.63
Sep 2008	18,945	516,667	0.42	18,945	9	0.63
Jan 2011	19,800	133,333	0.11	19,950	6	0.16
May 2011	19,920	266,666	0.22	19,950	6	0.33
Jan 2014	20,895	133,333	0.11	21,045	6	0.16
May 2014	21,015	133,333	0.11	21,045	6	0.16
Sep 2014	21,135	133,333	0.11	21,135	9	0.16
Jan 2017	21,990	766,666	0.62	22,140	6	0.93
May 2017	22,110	766,666	0.62	22,140	6	0.93

(Sheet 1 of 4)

Table 11 (Continued)						
Date	Elapsed Time (Days)	In-Channel Disposal Volume (cu yd)	In-Channel Disposal Height (ft)	Desiccation Start Time	Month Desiccation Starts	Initial Disposal Thickness at Craney Island (ft)
Sep 2017	22,230	766,666	0.62	22,230	9	0.93
Jan 2020	23,085	133,333	0.11	23,235	6	0.16
May 2020	23,205	133,333	0.11	23,235	6	0.16
Sep 2020	23,325	133,333	0.11	23,325	9	0.16
Jan 2023	24,180	200,000	0.16	24,330	6	0.24
May 2023	24,300	200,000	0.16	24,330	6	0.24
Sep 2023	24,420	200,000	0.16	24,420	9	0.24
Jan 2026	25,275	133,333	0.11	25,425	6	0.16
May 2026	25,395	133,333	0.11	25,425	6	0.16
Sep 2026	25,515	133,333	0.11	25,515	9	0.16
Jan 2029	26,370	166,666	0.13	26,520	6	0.20
May 2029	26,490	166,666	0.13	26,520	6	0.20
Sep 2029	26,610	166,666	0.13	26,610	9	0.20
Jan 2032	27,465	133,333	0.11	27,615	6	0.16
May 2032	27,585	133,333	0.11	27,615	6	0.16
Sep 2032	27,705	133,333	0.11	27,705	9	0.16
Jan 2034	28,195	200,000	0.16	28,345	6	0.24
May 2034	28,315	200,000	0.16	28,345	6	0.24
Sep 2034	28,435	200,000	0.16	28,435	9	0.24
Jan 2036	28,925	200,000	0.16	29,075	6	0.24
May 2036	29,045	200,000	0.16	29,075	6	0.24
Sep 2036	29,165	200,000	0.16	29,165	9	0.24
Jan 2038	29,655	766,666	0.62	29,805	6	0.93
May 2038	29,775	766,666	0.62	29,805	6	0.93
Sep 2038	29,895	766,666	0.62	29,895	9	0.93
Jan 2040	30,385	133,333	0.11	30,535	6	0.16
May 2040	30,505	133,333	0.11	30,535	6	0.16
Sep 2040	30,625	133,333	0.11	30,625	9	0.16
Jan 2042	31,115	133,333	0.11	31,265	6	0.16
May 2042	31,235	133,333	0.11	31,265	6	0.16
Sep 2042	31,355	133,333	0.11	31,355	9	0.16
Jan 2044	31,845	200,000	0.16	31,995	6	0.24
May 2044	31,965	200,000	0.16	31,995	6	0.24
Sep 2044	32,085	200,000	0.16	32,085	9	0.24
Jan 2046	32,575	133,333	0.11	32,725	6	0.16
May 2046	32,695	133,333	0.11	32,725	6	0.16

(Sheet 2 of 4)

Table 11 (Continued)						
Date	Elapsed Time (Days)	In-Channel Disposal Volume (cu yd)	In-Channel Disposal Height (ft)	Desiccation Start Time	Month Desiccation Starts	Initial Disposal Thickness at Craney Island (ft)
Sep 2046	32,815	133,333	0.11	32,815	9	0.16
Jan 2048	33,305	133,333	0.11	33,455	6	0.16
May 2048	33,425	133,333	0.11	33,455	6	0.16
Sep 2048	33,545	133,333	0.11	33,545	9	0.16
Jan 2050	34,035	166,666	0.13	34,185	6	0.20
May 2050	34,155	166,666	0.13	34,185	6	0.20
Sep 2050	34,275	166,666	0.13	34,275	9	0.20
Jan 2052	34,765	133,333	0.11	34,915	6	0.16
May 2052	34,885	133,333	0.11	34,915	6	0.16
Sep 2052	35,005	133,333	0.11	35,005	9	0.16
Jan 2054	35,495	200,000	0.16	35,645	6	0.24
May 2054	35,615	200,000	0.16	35,645	6	0.24
Sep 2054	35,735	200,000	0.16	35,735	9	0.24
Jan 2056	36,225	200,000	0.16	36,375	6	0.24
May 2056	36,345	200,000	0.16	36,375	6	0.24
Sep 2056	36,465	200,000	0.16	36,465	9	0.24
Jan 2058	36,955	766,666	0.62	37,105	6	0.93
May 2058	37,075	766,666	0.62	37,105	6	0.93
Sep 2058	37,195	766,666	0.62	37,195	9	0.93
Jan 2060	37,685	133,333	0.11	37,835	6	0.16
May 2060	37,805	133,333	0.11	37,835	6	0.16
Sep 2060	37,925	133,333	0.11	37,925	9	0.16
Jan 2062	38,415	133,333	0.11	38,565	6	0.16
May 2062	38,535	133,333	0.11	38,565	6	0.16
Sep 2062	38,655	133,333	0.11	38,655	9	0.16
Jan 2064	39,145	200,000	0.16	39,295	6	0.24
May 2064	39,265	200,000	0.16	39,295	6	0.24
Sep 2064	39,385	200,000	0.16	39,385	9	0.24
Jan 2066	39,875	133,333	0.11	40,025	6	0.16
May 2066	39,995	133,333	0.11	40,025	6	0.16
Sep 2066	40,115	133,333	0.11	40,115	9	0.16
Jan 2068	40,605	133,333	0.11	40,755	6	0.16
May 2068	40,725	133,333	0.11	40,755	6	0.16
Sep 2068	40,845	133,333	0.11	40,845	9	0.16
Jan 2070	41,335	166,666	0.13	41,485	6	0.20
May 2070	41,455	166,666	0.13	41,485	6	0.20
Sep 2070	41,575	166,666	0.13	41,575	9	0.20

(Sheet 3 of 4)

Table 11 (Concluded)						
Date	Elapsed Time (Days)	In-Channel Disposal Volume (cu yd)	In-Channel Disposal Height (ft)	Desiccation Start Time	Month Desiccation Starts	Initial Disposal Thickness at Craney Island (ft)
Jan 2072	42,065	133,333	0.11	42,215	6	0.16
May 2072	42,185	133,333	0.11	42,215	6	0.16
Sep 2072	42,305	133,333	0.11	42,305	9	0.16
Jan 2074	42,795	200,000	0.16	42,945	6	0.24
May 2074	42,915	200,000	0.16	42,945	6	0.24
Sep 2074	43,035	200,000	0.16	43,035	9	0.24
Jan 2076	43,525	200,000	0.16	43,675	6	0.24
May 2076	43,645	200,000	0.16	43,675	6	0.24
Sep 2076	43,765	200,000	0.16	43,765	9	0.24
Jan 2078	44,255	766,666	0.62	44,405	6	0.93
May 2078	44,375	766,666	0.62	44,405	6	0.93
Sep 2078	44,495	766,666	0.62	44,495	9	0.93
Jan 2080	44,985	133,333	0.11	45,135	6	0.16
May 2080	45,105	133,333	0.11	45,135	6	0.16
Sep 2080	45,225	133,333	0.11	45,225	9	0.16

(Sheet 4 of 4)

Total In-Channel Disposal Volume for Center Compartment = 36,865,493 cu yd.
Total CIDMMA Disposal Volume in Center Compartment = 55,077,047 cu yd.

Table 12
Approximated Disposal History for Worst Case Dredging Scenario in South Compartment from 1984 to 2079

Date	Elapsed Time (Days)	In-Channel Disposal Volume (cu yd)	In-Channel Disposal Height (ft)	Desiccation Start Time	Month Desiccation Starts	Initial Disposal Thickness at Craney Island (ft)
Apr 1984	10,035	869,433	0.73	10,095	6	1.09
Sep 1984	10,185	1,391,094	1.17	10,185	9	1.75
Jun 1987	11,190	2,812,748	2.37	11,190	6	3.54
May 1989	12,255	1,457,070	1.23	12,285	6	1.84
Sep 1989	12,375	916,834	0.77	12,375	9	1.16
Jan 1992	12,865	689,456	0.58	13,015	6	0.88
May 1992	12,985	689,456	0.58	13,015	6	0.88
Sep 1992	13,105	689,456	0.58	13,015	9	0.88
Worst Case Dredging Scenario in Restricted Use Program (McGee 1992)						
Jan 1994	13,595	133,333	0.11	13,745	6	0.16
May 1994	13,715	133,333	0.11	13,745	6	0.16
Sep 1994	13,835	133,333	0.11	13,835	9	0.16
Jan 1997	14,690	766,666	0.65	14,840	6	0.97
May 1997	14,810	766,666	0.65	14,840	6	0.97
Sep 1997	14,930	766,666	0.65	14,930	9	0.97
Jan 2000	15,785	133,333	0.11	15,935	6	0.16
May 2000	15,905	133,333	0.11	15,935	6	0.16
Sep 2000	16,025	133,333	0.11	16,025	9	0.16
Jan 2003	16,880	200,000	0.17	17,030	6	0.25
May 2003	17,000	200,000	0.17	17,030	6	0.25
Sep 2003	17,120	200,000	0.17	17,120	9	0.25
Jan 2006	17,975	133,333	0.11	18,125	6	0.16
May 2006	18,095	133,333	0.11	18,125	6	0.16
Sep 2006	18,215	133,333	0.11	18,215	9	0.16
Jan 2009	19,070	166,666	0.14	19,220	6	0.21
May 2009	19,190	166,666	0.14	19,220	6	0.21
Sep 2009	19,310	166,666	0.14	19,310	9	0.21
Jan 2012	20,165	133,333	0.11	20,315	6	0.16
May 2012	20,285	266,666	0.22	20,315	6	0.33
Jan 2015	21,260	200,000	0.17	21,410	6	0.25
May 2015	21,380	200,000	0.17	21,410	6	0.25
Sep 2015	21,500	200,000	0.17	21,500	9	0.25
Jan 2018	22,355	516,666	0.44	22,505	6	0.65
May 2018	24,300	516,666	0.44	22,505	6	0.65
Sep 2018	24,420	516,666	0.44	24,420	9	0.65
Jan 2021	23,450	133,333	0.11	23,600	6	0.16

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Table 12 (Continued)						
Date	Elapsed Time (Days)	In-Channel Disposal Volume (cu yd)	In-Channel Disposal Height (ft)	Desiccation Start Time	Month Desiccation Starts	Initial Disposal Thickness at Craney Island (ft)
May 2021	23,570	133,333	0.11	23,600	6	0.16
Sep 2021	23,690	133,333	0.11	23,690	9	0.16
Jan 2024	24,545	133,333	0.11	24,695	6	0.16
May 2024	24,665	133,333	0.11	24,695	6	0.16
Sep 2024	24,785	133,333	0.11	24,785	9	0.16
Jan 2027	25,640	133,333	0.11	25,790	6	0.16
May 2027	25,760	133,333	0.11	25,790	6	0.16
Sep 2027	25,880	133,333	0.11	25,880	9	0.16
Jan 2030	26,735	133,333	0.11	26,885	6	0.16
May 2030	26,855	133,333	0.11	26,885	6	0.16
Sep 2030	26,975	133,333	0.11	26,975	9	0.16
Jan 2033	27,830	133,333	0.11	27,980	6	0.16
May 2033	27,950	133,333	0.11	27,980	6	0.16
Sep 2033	28,070	133,333	0.11	28,070	9	0.16
Jan 2035	28,560	133,333	0.11	28,710	6	0.16
May 2035	28,680	133,333	0.11	28,710	6	0.16
Sep 2035	28,800	133,333	0.11	28,800	9	0.16
Jan 2037	29,290	766,666	0.65	29,440	6	0.97
May 2037	29,410	766,666	0.65	29,440	6	0.97
Sep 2037	29,530	766,666	0.65	29,530	9	0.97
Jan 2039	30,020	516,666	0.44	30,170	6	0.65
May 2039	30,140	516,666	0.44	30,170	6	0.65
Sep 2039	30,260	516,666	0.44	30,260	9	0.65
Jan 2041	30,750	133,333	0.11	30,900	6	0.16
May 2041	30,870	133,333	0.11	30,900	6	0.16
Sep 2041	30,990	133,333	0.11	30,990	9	0.16
Jan 2043	31,480	133,333	0.11	31,360	6	0.16
May 2043	31,600	133,333	0.11	31,630	6	0.16
Sep 2043	31,720	133,333	0.11	31,720	9	0.16
Jan 2045	32,210	133,333	0.11	32,360	6	0.16
May 2045	32,330	133,333	0.11	32,360	6	0.16
Sep 2045	32,450	133,333	0.11	32,450	9	0.16
Jan 2047	32,940	133,333	0.11	33,090	6	0.16
May 2047	33,060	133,333	0.11	33,090	6	0.16
Sep 2047	33,180	133,333	0.11	33,180	9	0.16
Jan 2049	33,670	516,666	0.44	33,820	6	0.65
May 2049	33,790	516,666	0.44	33,820	6	0.65

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Table 12 (Continued)						
Date	Elapsed Time (Days)	In-Channel Disposal Volume (cu yd)	In-Channel Disposal Height (ft)	Desiccation Start Time	Month Desiccation Starts	Initial Disposal Thickness at Craney Island (ft)
Sep 2049	33,910	516,666	0.44	33,910	9	0.65
Jan 2051	34,400	133,333	0.11	34,550	6	0.16
May 2051	34,520	133,333	0.11	34,550	6	0.16
Sep 2051	34,640	133,333	0.11	34,640	9	0.16
Jan 2053	35,130	133,333	0.11	35,280	6	0.16
May 2053	35,250	133,333	0.11	35,280	6	0.16
Sep 2053	35,370	133,333	0.11	35,370	9	0.16
Jan 2055	35,860	133,333	0.11	36,010	6	0.16
May 2055	35,980	133,333	0.11	36,010	6	0.16
Sep 2055	36,100	133,333	0.11	36,100	9	0.16
Jan 2057	36,590	766,666	0.65	36,740	6	0.97
May 2057	36,710	766,666	0.65	36,740	6	0.97
Sep 2057	36,830	766,666	0.65	36,830	9	0.97
Jan 2059	37,320	516,666	0.44	37,470	6	0.65
May 2059	37,440	516,666	0.44	37,470	6	0.65
Sep 2059	37,560	516,666	0.44	37,560	9	0.65
Jan 2061	38,050	133,333	0.11	38,200	6	0.16
May 2061	38,170	133,333	0.11	38,200	6	0.16
Sep 2061	38,290	133,333	0.11	38,290	9	0.16
Jan 2063	38,780	133,333	0.11	38,930	6	0.16
May 2063	38,900	133,333	0.11	38,930	6	0.16
Sep 2063	39,020	133,333	0.11	39,020	9	0.16
Jan 2065	39,510	133,333	0.11	39,660	6	0.16
May 2065	39,630	133,333	0.11	39,660	6	0.16
Sep 2065	39,750	133,333	0.11	39,750	9	0.16
Jan 2067	40,240	133,333	0.11	40,390	6	0.16
May 2067	40,360	133,333	0.11	40,390	6	0.16
Sep 2067	40,480	133,333	0.11	40,480	9	0.16
Jan 2069	40,970	516,666	0.44	41,120	6	0.65
May 2069	41,091	516,666	0.44	41,120	6	0.65
Sep 2069	41,210	516,666	0.44	41,210	9	0.65
Jan 2071	41,700	133,333	0.11	41,850	6	0.16
May 2071	41,820	133,333	0.11	41,850	6	0.16
Sep 2071	41,940	133,333	0.11	41,940	9	0.16
Jan 2073	42,430	133,333	0.11	42,580	6	0.16
May 2073	42,550	133,333	0.11	42,580	6	0.16
Sep 2073	42,670	133,333	0.11	42,670	9	0.16

(Sheet 3 of 4)

Table 12 (Concluded)

Date	Elapsed Time (Days)	In-Channel Disposal Volume (cu yd)	In-Channel Disposal Height (ft)	Desiccation Start Time	Month Desiccation Starts	Initial Disposal Thickness at Craney Island (ft)
Jan 2075	43,160	133,333	0.11	43,310	6	0.16
May 2075	43,280	133,333	0.11	43,310	6	0.16
Sep 2075	43,400	133,333	0.11	43,400	9	0.16
Jan 2077	43,890	766,666	0.65	44,040	6	0.97
May 2077	44,010	766,666	0.65	44,040	6	0.97
Sep 2077	44,130	766,666	0.65	44,130	9	0.97
Jan 2079	44,620	516,666	0.44	44,770	6	0.65
May 2079	44,740	516,666	0.44	44,770	6	0.65
Sep 2079	44,860	516,666	0.44	44,860	9	0.65

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Total In-Channel Disposal Volume for South Compartment = 39,315,501 cu yd.
Total CIDMMA Disposal Volume in South Compartment = 58,737,359 cu yd.

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Timothy D. Stark

7. PERFORMING ORGANIZATION NAME(S) AND ADDRESS(ES)
University of Illinois at Urbana-Champaign
205 N. Mathews Avenue
Urbana, IL 61801-2352

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Approved for public release; distribution is unlimited.

12b. DISTRIBUTION CODE

13. ABSTRACT *(Maximum 200 words)*

This study investigates the service life of the Craney Island Dredged Material Management Area (CIDMMA) under the proposed Restricted Use Program. The Restricted Use Program involves ocean dumping of suitable material and the other material being placed in the CIDMMA. The projected filling rates of the CIDMMA under the Restricted Use Program were estimated using a mathematical model that considers both consolidation and desiccation of the dredged material. Mathematical model simulations of past filling history between 1956 and 1992 show excellent agreement with field data. This simulation served to calibrate the model and input parameters for future projection of fill rates under the proposed Restricted Use Program. Based on projections of fill rates under the Restricted Use Program, the service life of the CIDMMA will be extended significantly by reducing the quantity of dredged material placed in the CIDMMA. It is estimated that the CIDMMA will reach capacity near the year 2130 under the Baseline Maintenance Dredging Case and around the year 2080 under the Worst Case Dredging Scenario. These service life estimates are for planning level purposes and should only be used to determine if the proposed Restricted Use Program deserves further consideration.

(Continued)

14. SUBJECT TERMS
Consolidation of soils
Craney Island
Dredged material management
Simulations
Strip drains

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19. SECURITY CLASSIFICATION OF ABSTRACT

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13. (Continued).

Implementation of the Restricted Use Program will require a substantial amount of suitable material to be ocean dumped. Since ocean dumping is significantly more expensive than confined disposal, it is recommended that the life of the CIDMMA be extended. One technique being investigated to extend the service life is the installation of vertical strip drains. Strip drains will accelerate consolidation of the dredged fill and foundation clay at the CIDMMA. Consolidation of these materials will result in substantial settlement and increase in storage capacity.